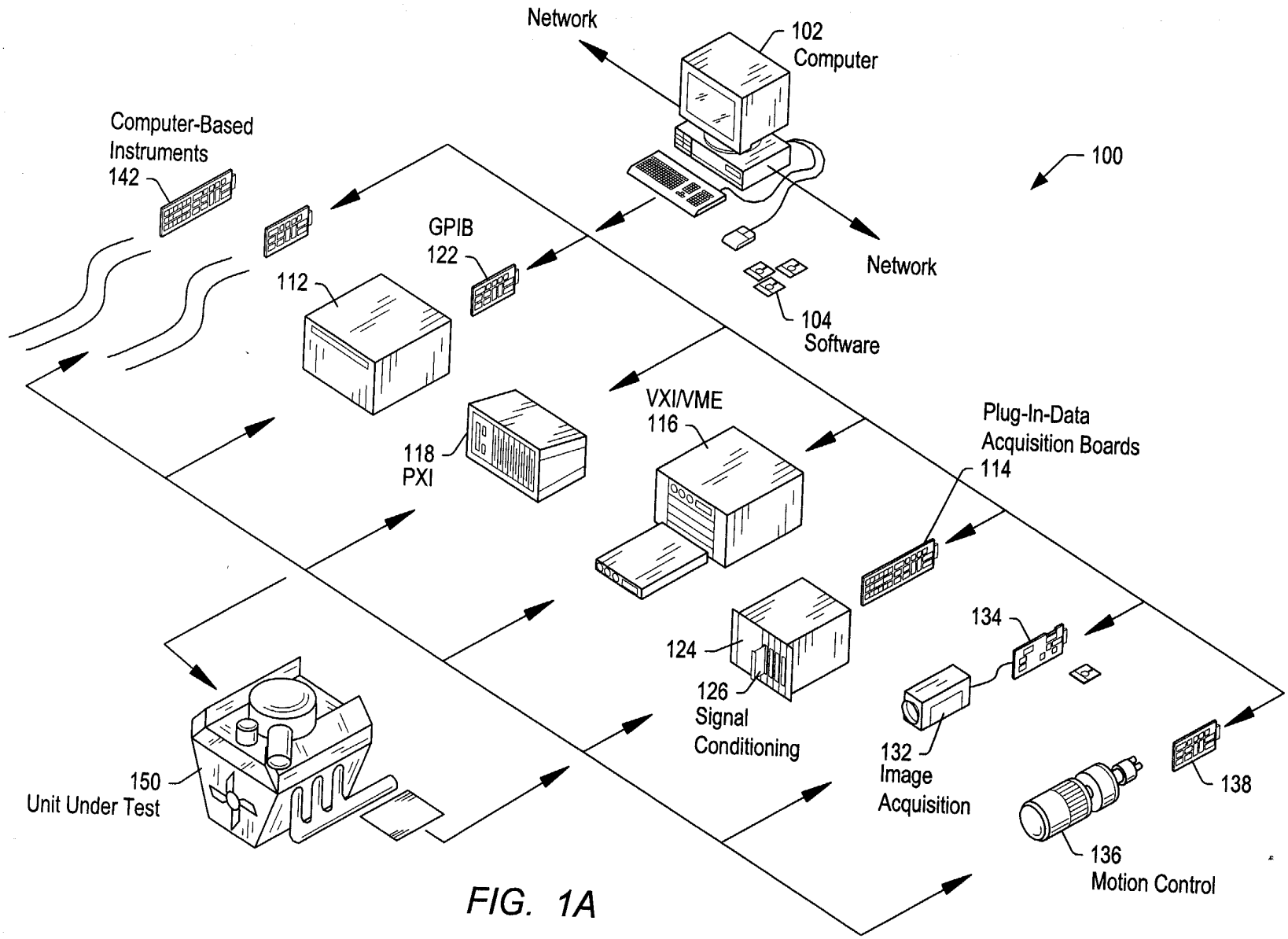

Network
102
Computer
Computer-Based
Instruments
142
100
GPIB
122
112
Network
104
Software
VXI/VME
116
118
PXI
Plug-In-Data
Acquisition Boards
114
124
126
Signal
Conditioning
134
132
Image
Acquisition
138
150
Unit Under Test
136
Motion Control

FIG. 1A

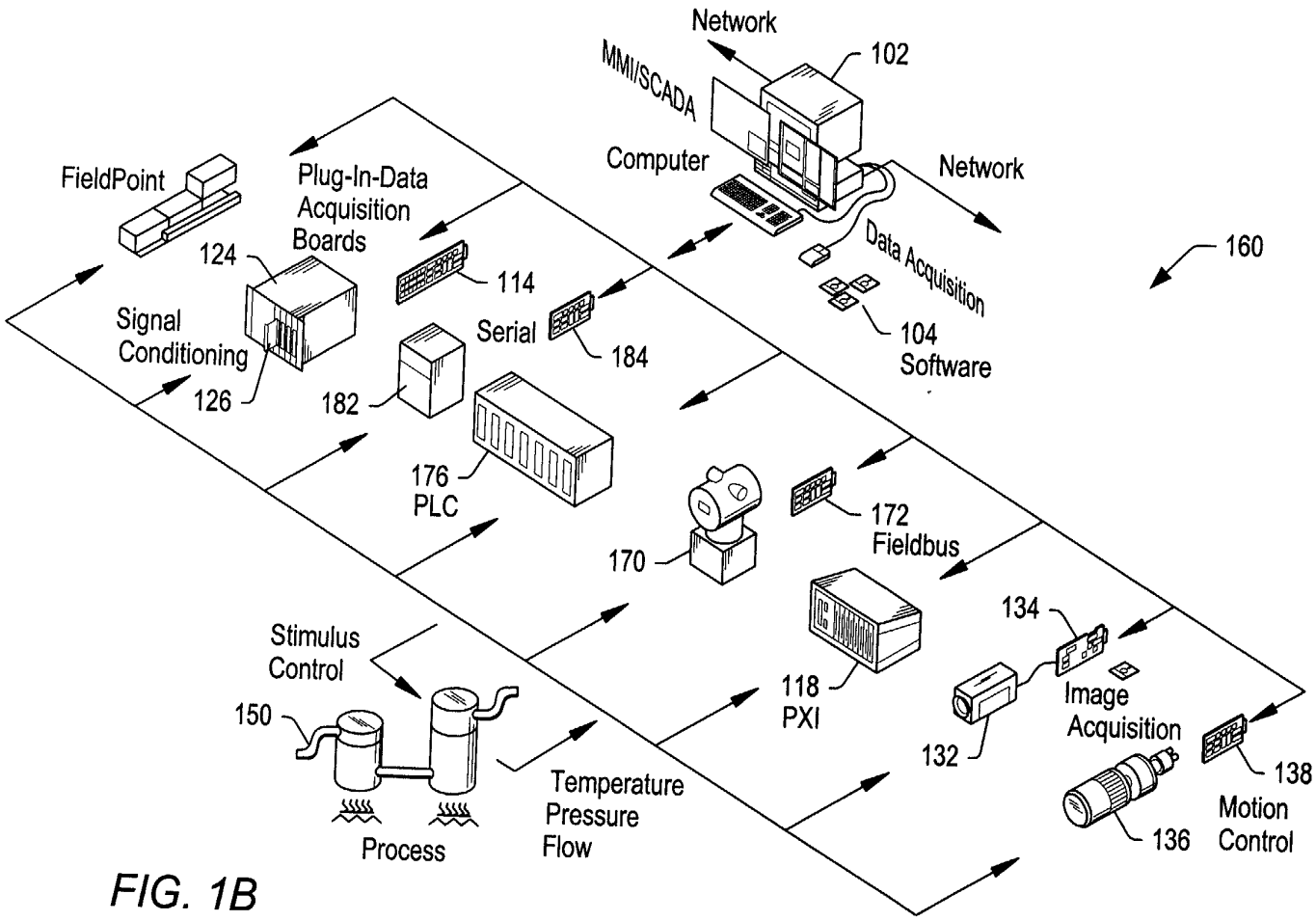

Network
102
MMI/SCADA
Computer
Network
FieldPoint
Plug-In-Data Acquisition Boards
124
114
Signal Conditioning
126
Serial
184
182
Data Acquisition
104 Software
160
176 PLC
170
172 Fieldbus
Stimulus Control
150
118 PXI
134
Image Acquisition
132
138
Motion Control
136
Temperature
Pressure
Flow
Process

FIG. 1B

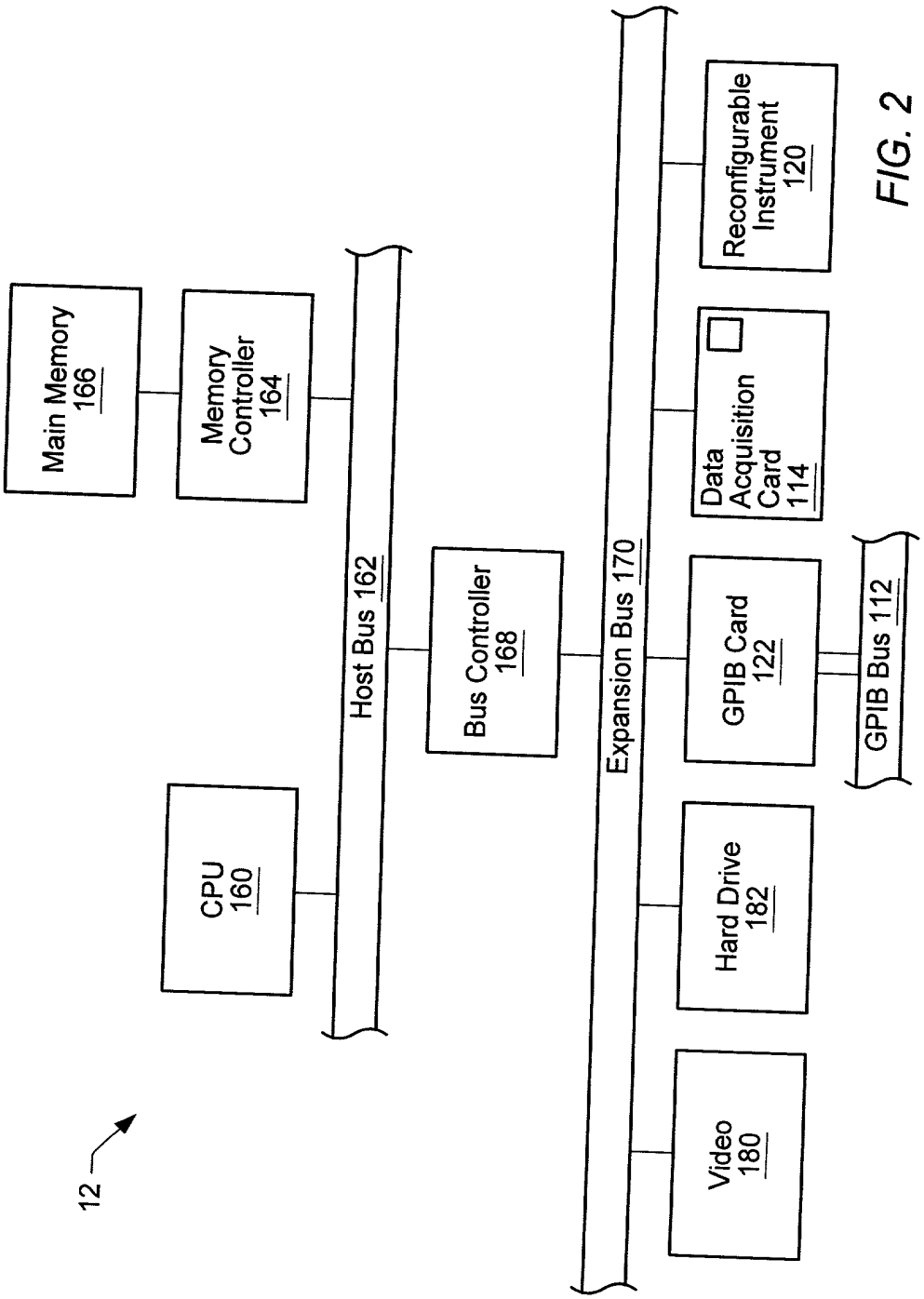

12
CPU 160
Main Memory 166
Memory Controller 164
Host Bus 162
Bus Controller 168
Expansion Bus 170
Video 180
Hard Drive 182
GPIB Card 122
GPIB Bus 112
Data Acquisition Card 114
Reconfigurable Instrument 120

FIG. 2

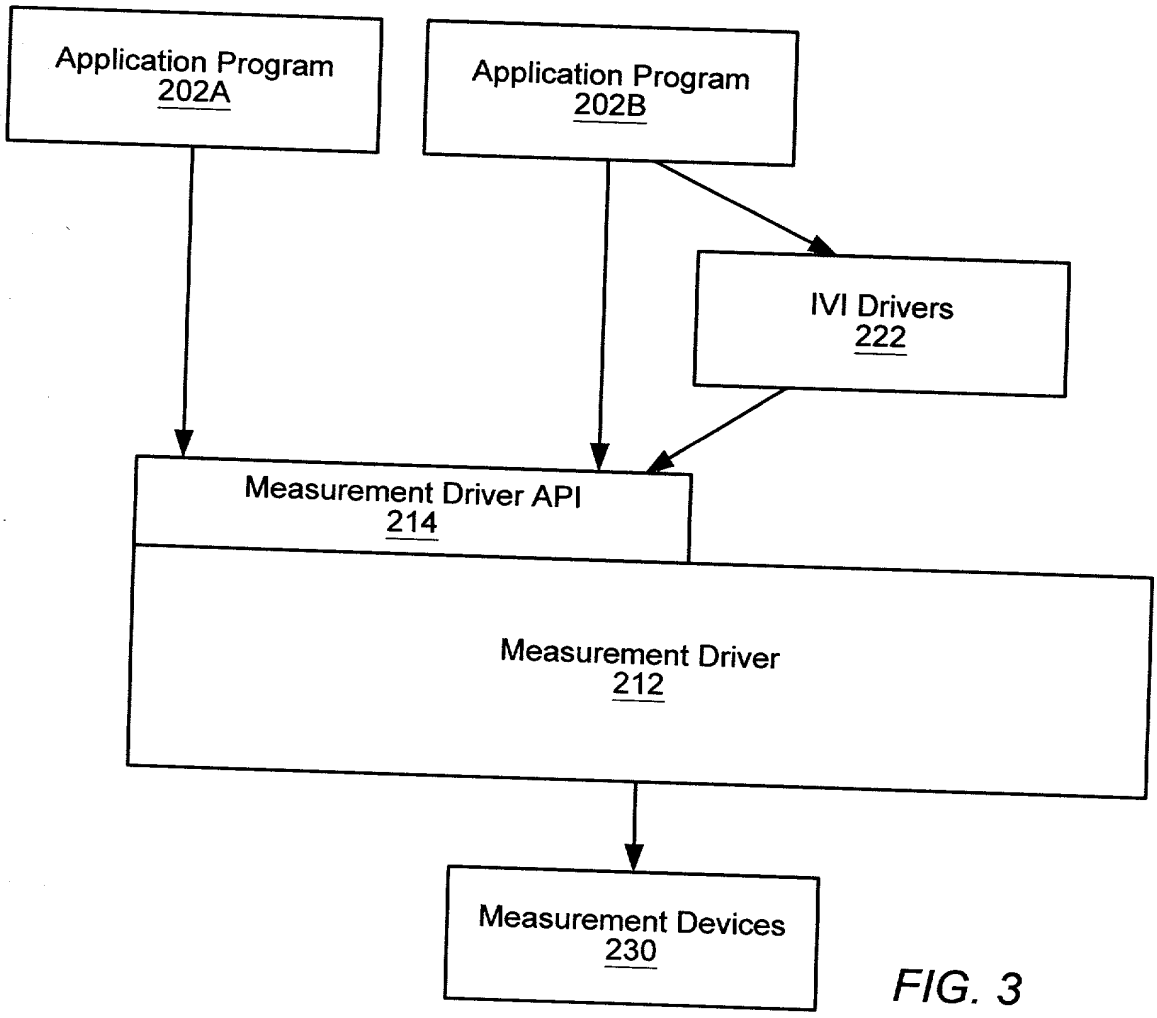

Application Program
202A
Application Program
202B
IVI Drivers
222
Measurement Driver API
214
Measurement Driver
212
Measurement Devices
230

FIG. 3

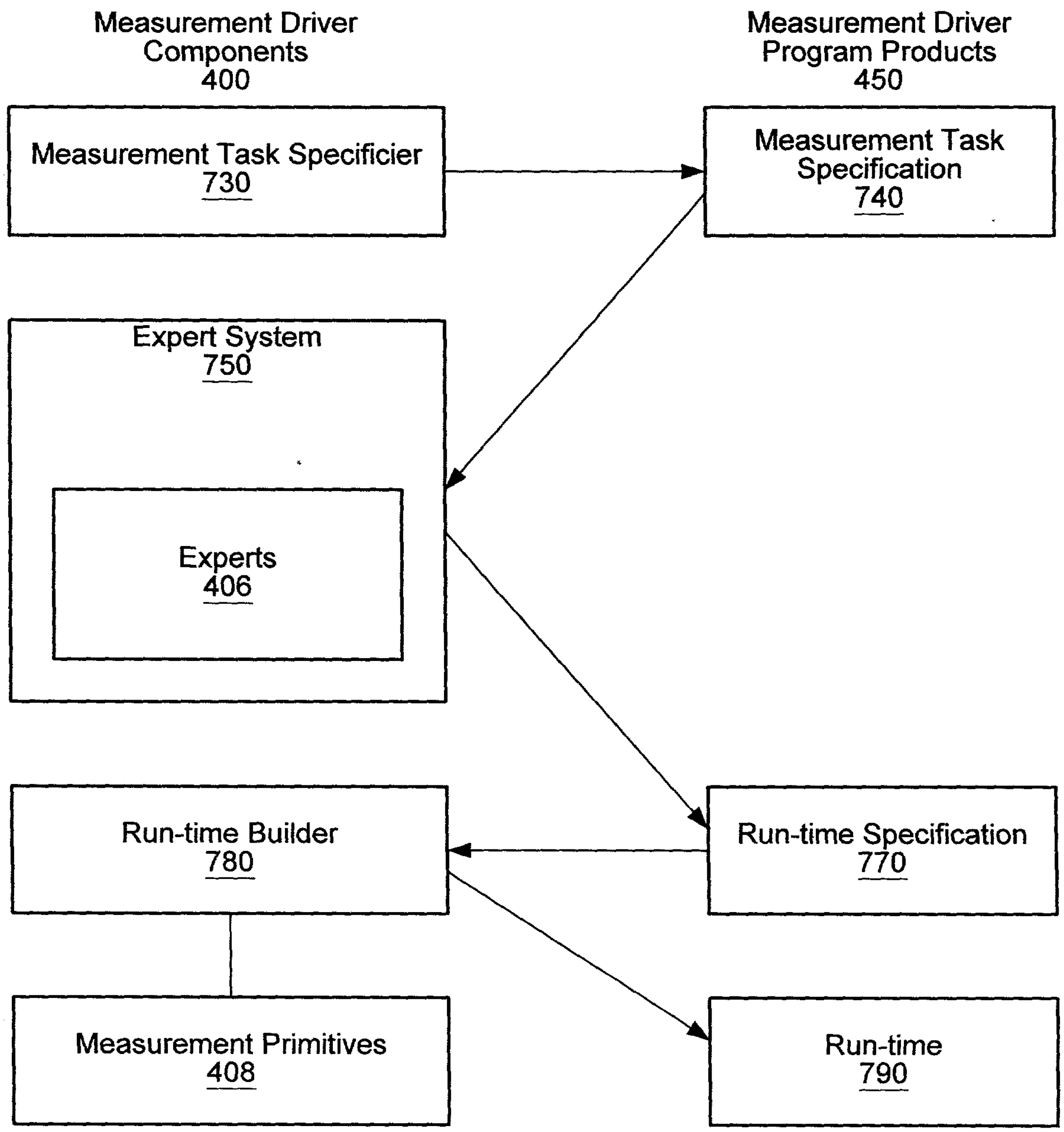


FIG. 4

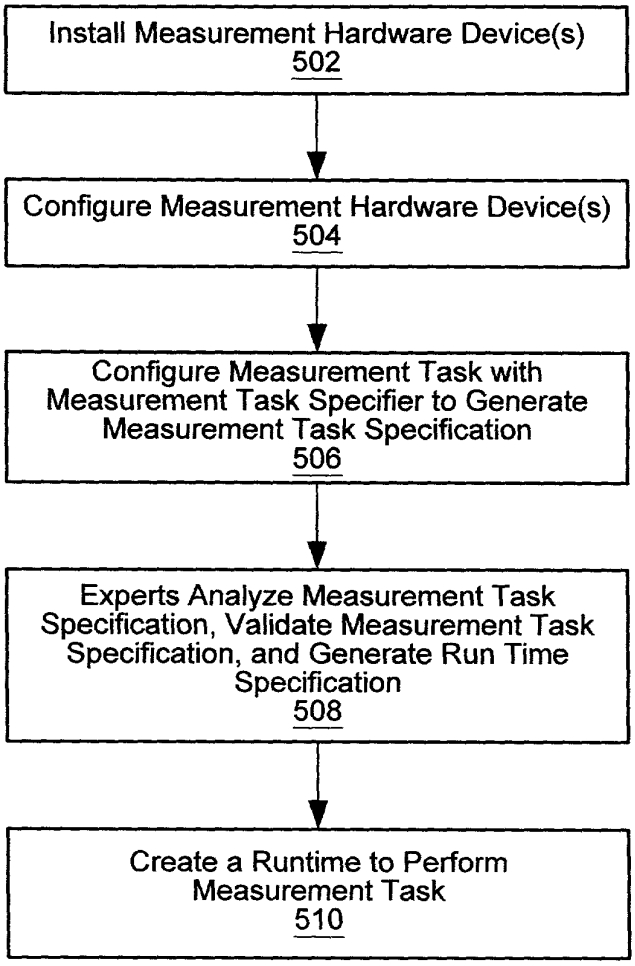


FIG. 5

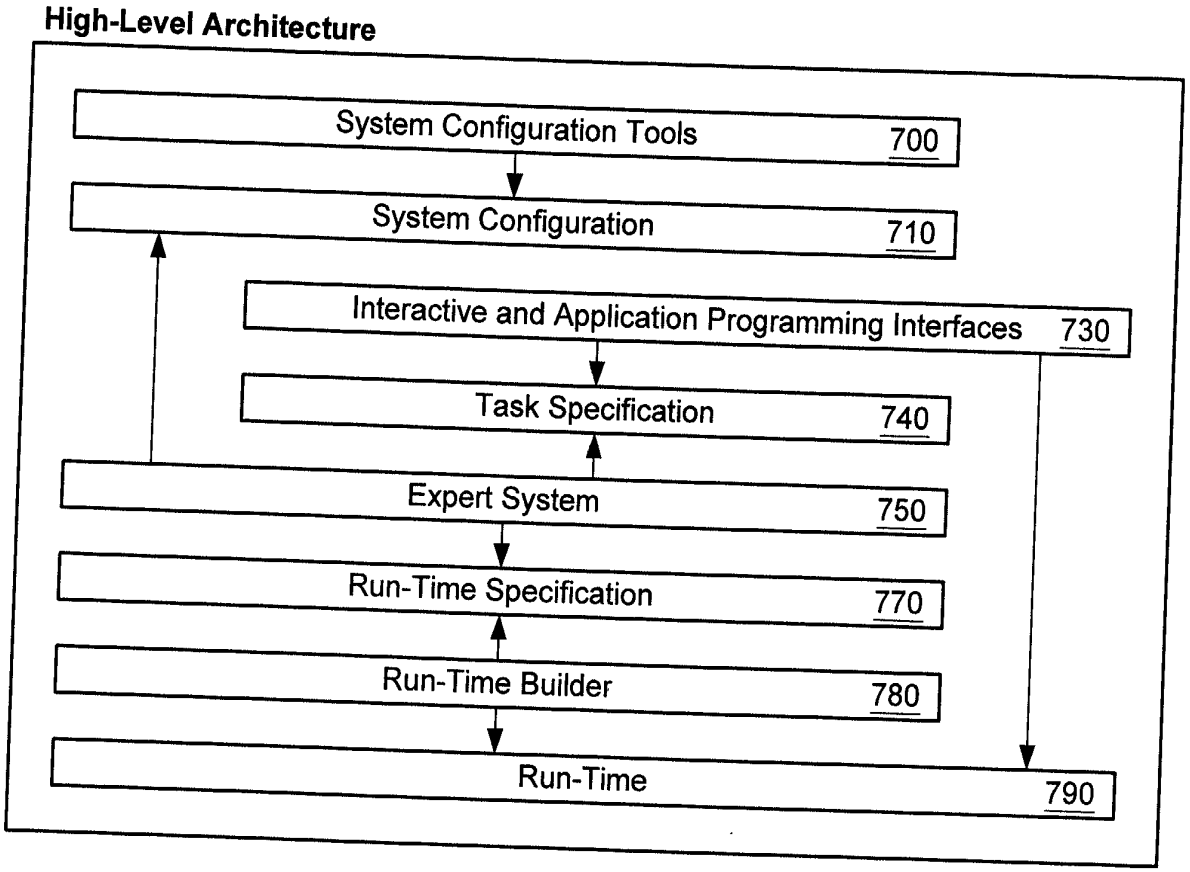

High-Level Architecture
System Configuration Tools 700
System Configuration 710
Interactive and Application Programming Interfaces 730
Task Specification 740
Expert System 750
Run-Time Specification 770
Run-Time Builder 780
Run-Time 790

FIG. 6

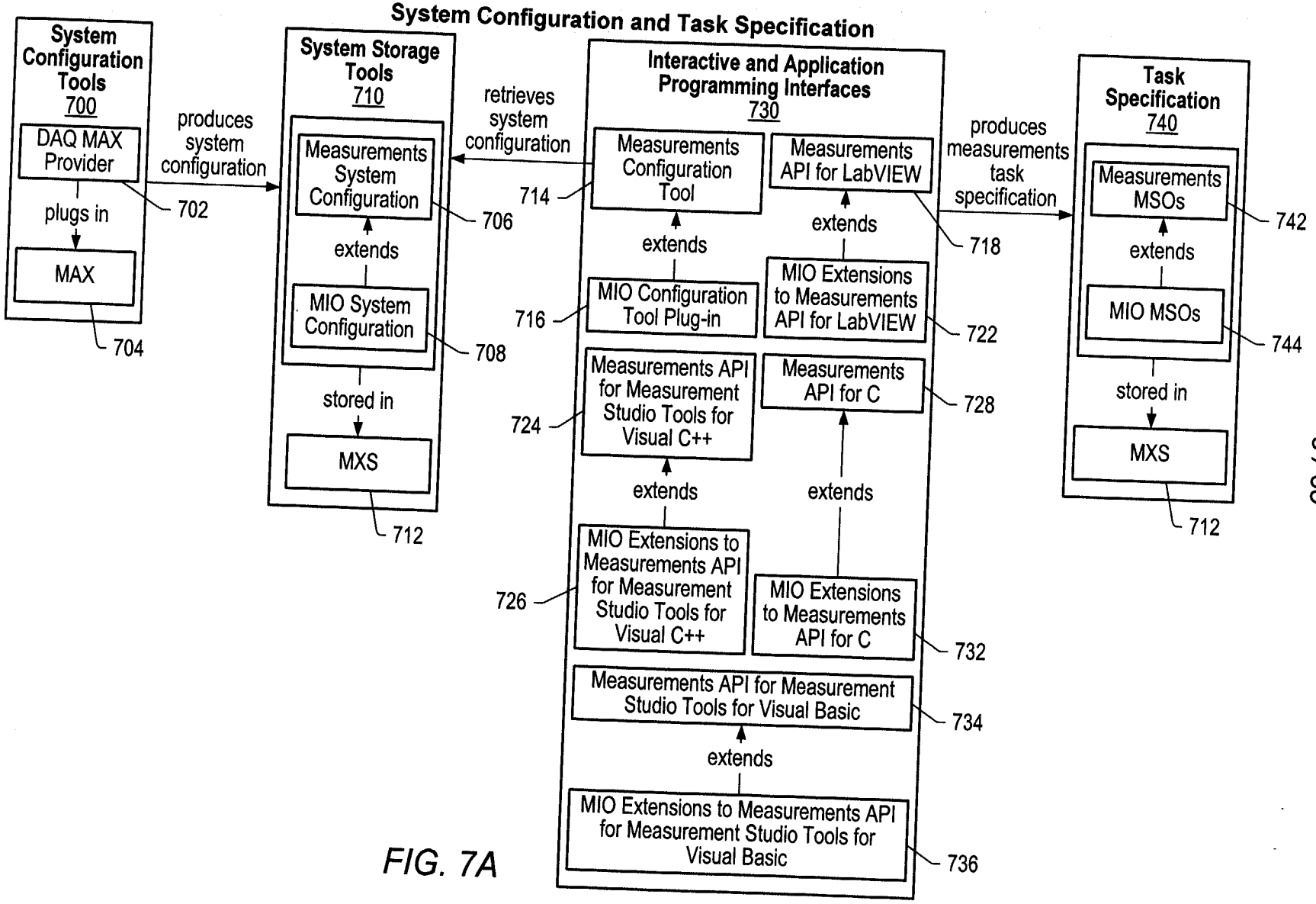

System Configuration and Task Specification
System Configuration Tools
700
DAQ MAX Provider
plugs in
MAX
704
produces system configuration
702
System Storage Tools
710
Measurements System Configuration
706
extends
MIO System Configuration
708
stored in
MXS
712
retrieves system configuration
Interactive and Application Programming Interfaces
730
Measurements Configuration Tool
714
Measurements API for LabVIEW
extends
extends
MIO Configuration Tool Plug-in
716
MIO Extensions to Measurements API for LabVIEW
722
Measurements API for Measurement Studio Tools for Visual C++
724
Measurements API for C
728
extends
extends
MIO Extensions to Measurements API for Measurement Studio Tools for Visual C++
726
MIO Extensions to Measurements API for C
732
Measurements API for Measurement Studio Tools for Visual Basic
734
extends
MIO Extensions to Measurements API for Measurement Studio Tools for Visual Basic
736
produces measurements task specification
718
Task Specification
740
Measurements MSOs
742
extends
MIO MSOs
744
stored in
MXS
712

FIG. 7A

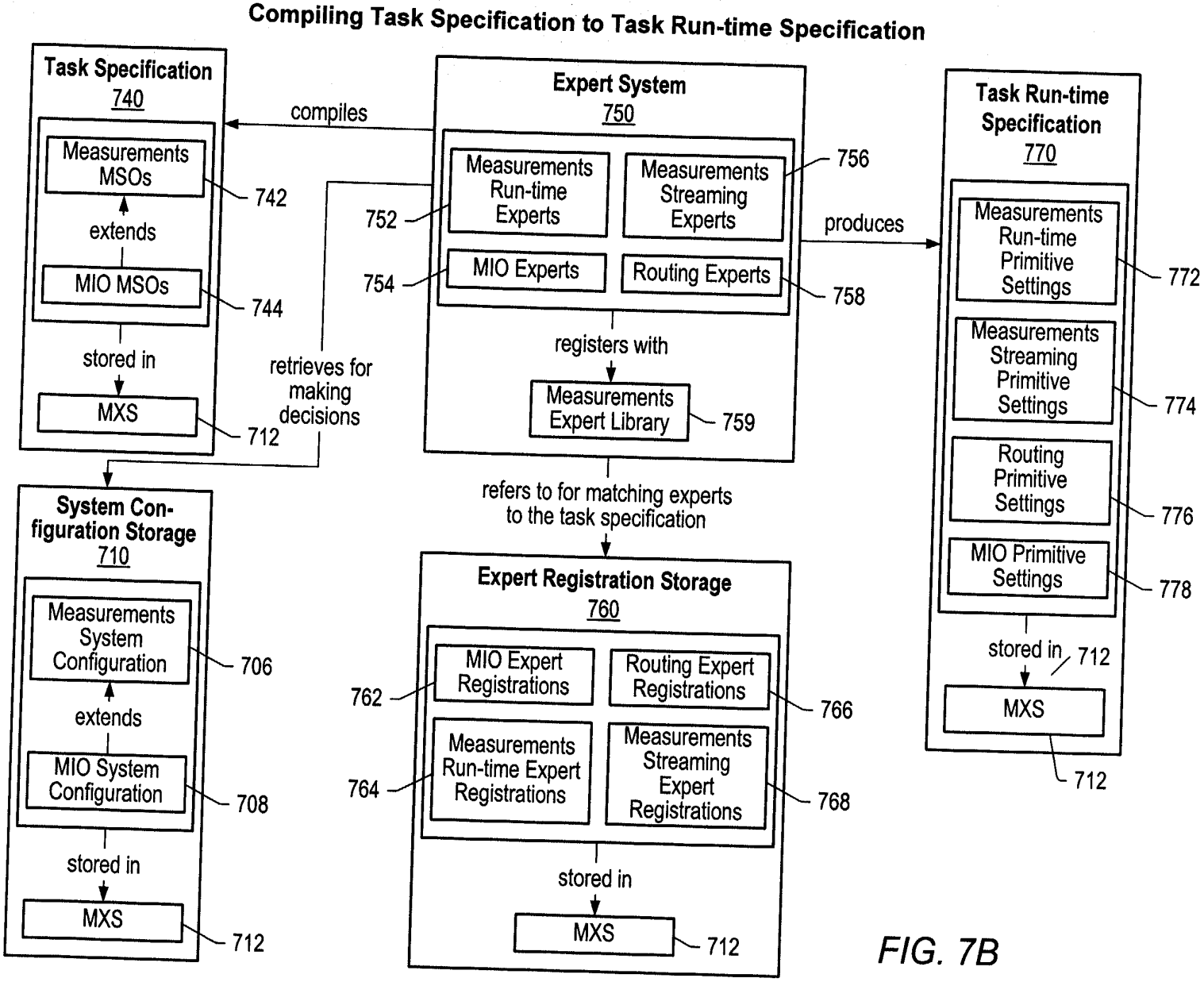

Compiling Task Specification to Task Run-time Specification
Task Specification
740
Measurements MSOs
742
extends
MIO MSOs
744
stored in
MXS
712
compiles
retrieves for making decisions
Expert System
750
Measurements Run-time Experts
752
Measurements Streaming Experts
756
MIO Experts
754
Routing Experts
758
registers with
Measurements Expert Library
759
produces
Task Run-time Specification
770
Measurements Run-time Primitive Settings
772
Measurements Streaming Primitive Settings
774
Routing Primitive Settings
776
MIO Primitive Settings
778
stored in
712
MXS
712
System Configuration Storage
710
Measurements System Configuration
706
extends
MIO System Configuration
708
stored in
MXS
712
refers to for matching experts to the task specification
Expert Registration Storage
760
MIO Expert Registrations
762
Routing Expert Registrations
766
Measurements Run-time Expert Registrations
764
Measurements Streaming Expert Registrations
768
stored in
MXS
712

FIG. 7B

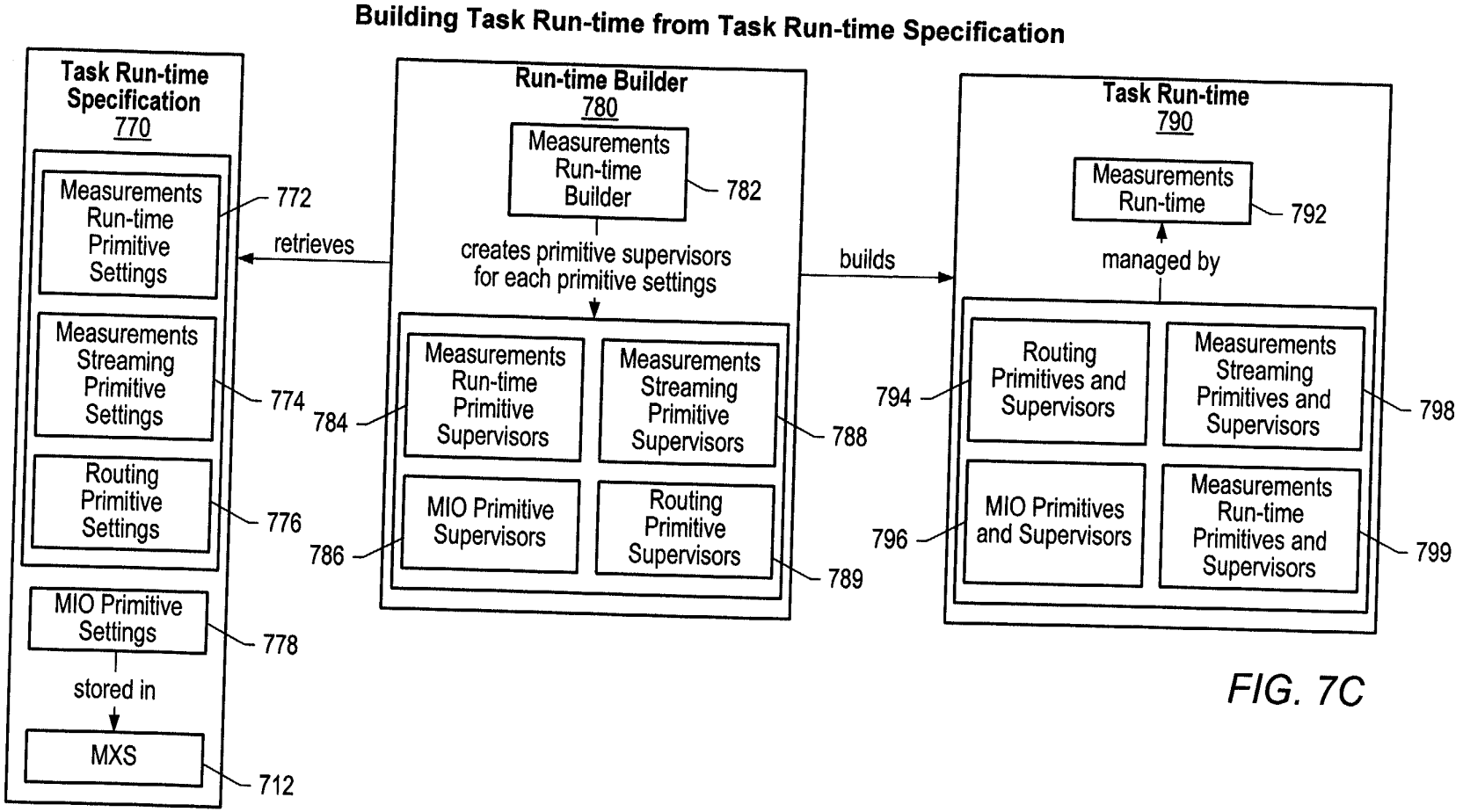

Building Task Run-time from Task Run-time Specification
Task Run-time Specification
770
Measurements Run-time Primitive Settings
772
Measurements Streaming Primitive Settings
774
Routing Primitive Settings
776
MIO Primitive Settings
778
stored in
MXS
712
retrieves
Run-time Builder
780
Measurements Run-time Builder
782
creates primitive supervisors for each primitive settings
Measurements Run-time Primitive Supervisors
784
Measurements Streaming Primitive Supervisors
788
MIO Primitive Supervisors
786
Routing Primitive Supervisors
789
builds
Task Run-time
790
Measurements Run-time
792
managed by
Routing Primitives and Supervisors
794
Measurements Streaming Primitives and Supervisors
798
MIO Primitives and Supervisors
796
Measurements Run-time Primitives and Supervisors
799

FIG. 7C

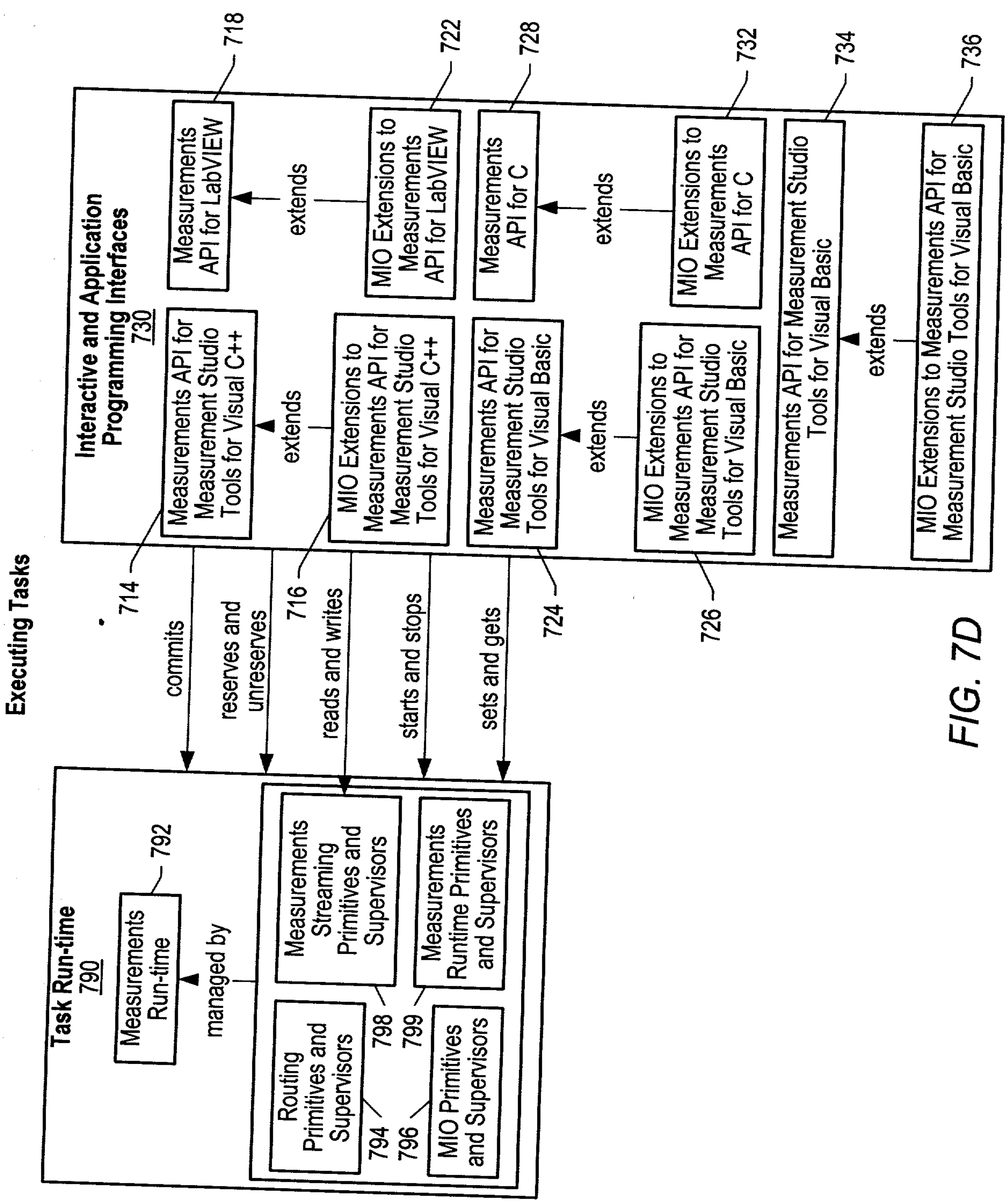

Interactive and Application Programming Interfaces
730
Measurements API for LabVIEW
718
extends
MIO Extensions to Measurements API for LabVIEW
722
Measurements API for C
728
extends
MIO Extensions to Measurements API for C
732
Measurements API for Measurement Studio Tools for Visual C++
714
extends
MIO Extensions to Measurements API for Measurement Studio Tools for Visual C++
716
Measurements API for Measurement Studio Tools for Visual Basic
724
extends
MIO Extensions to Measurements API for Measurement Studio Tools for Visual Basic
726
Measurements API for Measurement Studio Tools for Visual Basic
734
extends
MIO Extensions to Measurements API for Measurement Studio Tools for Visual Basic
736
Executing Tasks
commits
reserves and unreserves
reads and writes
starts and stops
sets and gets
Task Run-time
790
Measurements Run-time
792
managed by
Measurements Streaming Primitives and Supervisors
798
Measurements Runtime Primitives and Supervisors
799
Routing Primitives and Supervisors
794
MIO Primitives and Supervisors
796

FIG. 7D

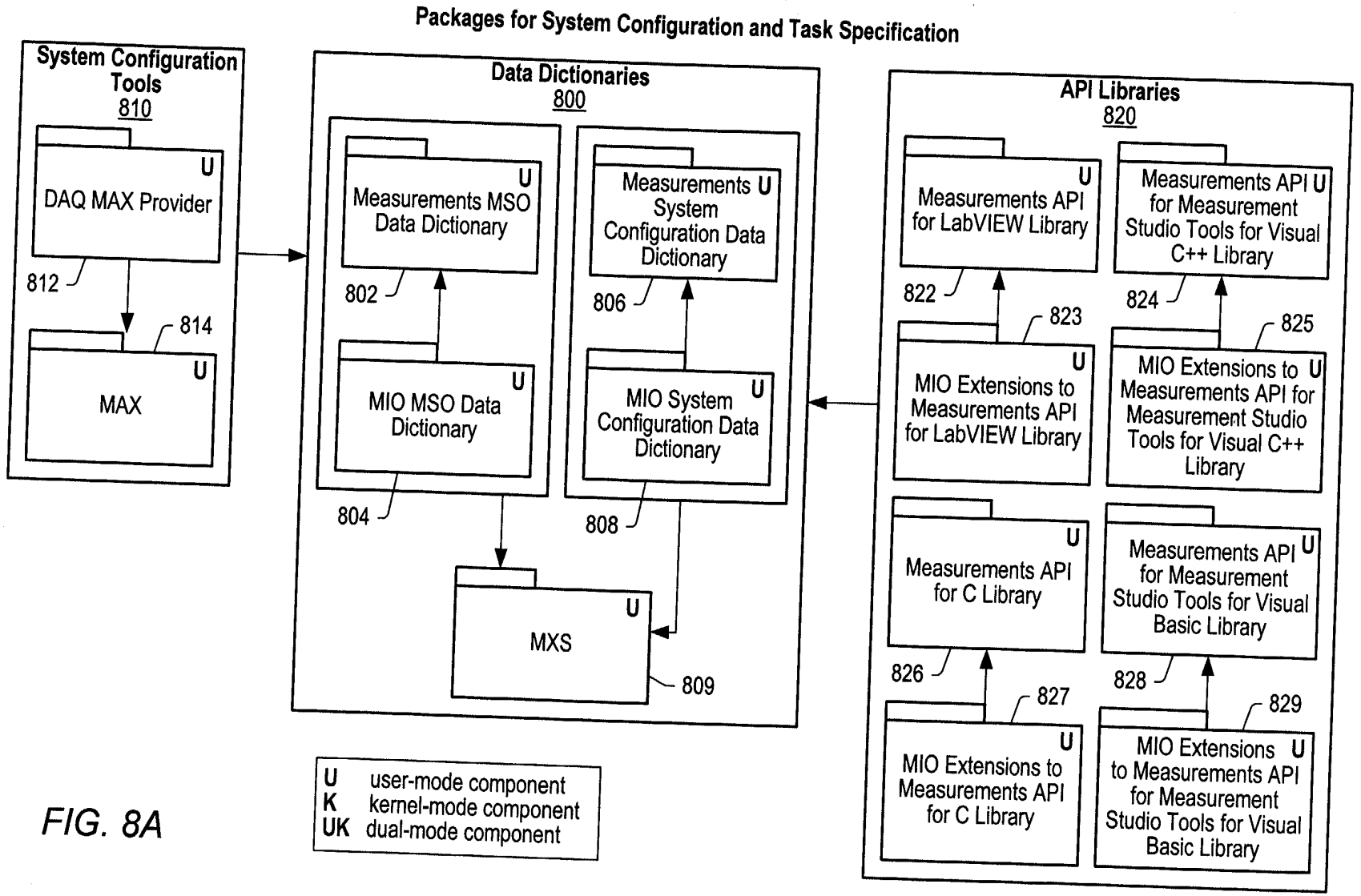

Packages for System Configuration and Task Specification
System Configuration Tools
810
U
DAQ MAX Provider
812
814
U
MAX
Data Dictionaries
800
U
Measurements MSO Data Dictionary
802
U
MIO MSO Data Dictionary
804
Measurements U System Configuration Data Dictionary
806
U
MIO System Configuration Data Dictionary
808
U
MXS
809
API Libraries
820
U
Measurements API for LabVIEW Library
822
823
U
MIO Extensions to Measurements API for LabVIEW Library
Measurements API U for Measurement Studio Tools for Visual C++ Library
824
825
MIO Extensions to U Measurements API for Measurement Studio Tools for Visual C++ Library
U
Measurements API for C Library
826
827
U
MIO Extensions to Measurements API for C Library
Measurements API U for Measurement Studio Tools for Visual Basic Library
828
829
MIO Extensions U to Measurements API for Measurement Studio Tools for Visual Basic Library
U user-mode component
K kernel-mode component
UK dual-mode component

FIG. 8A

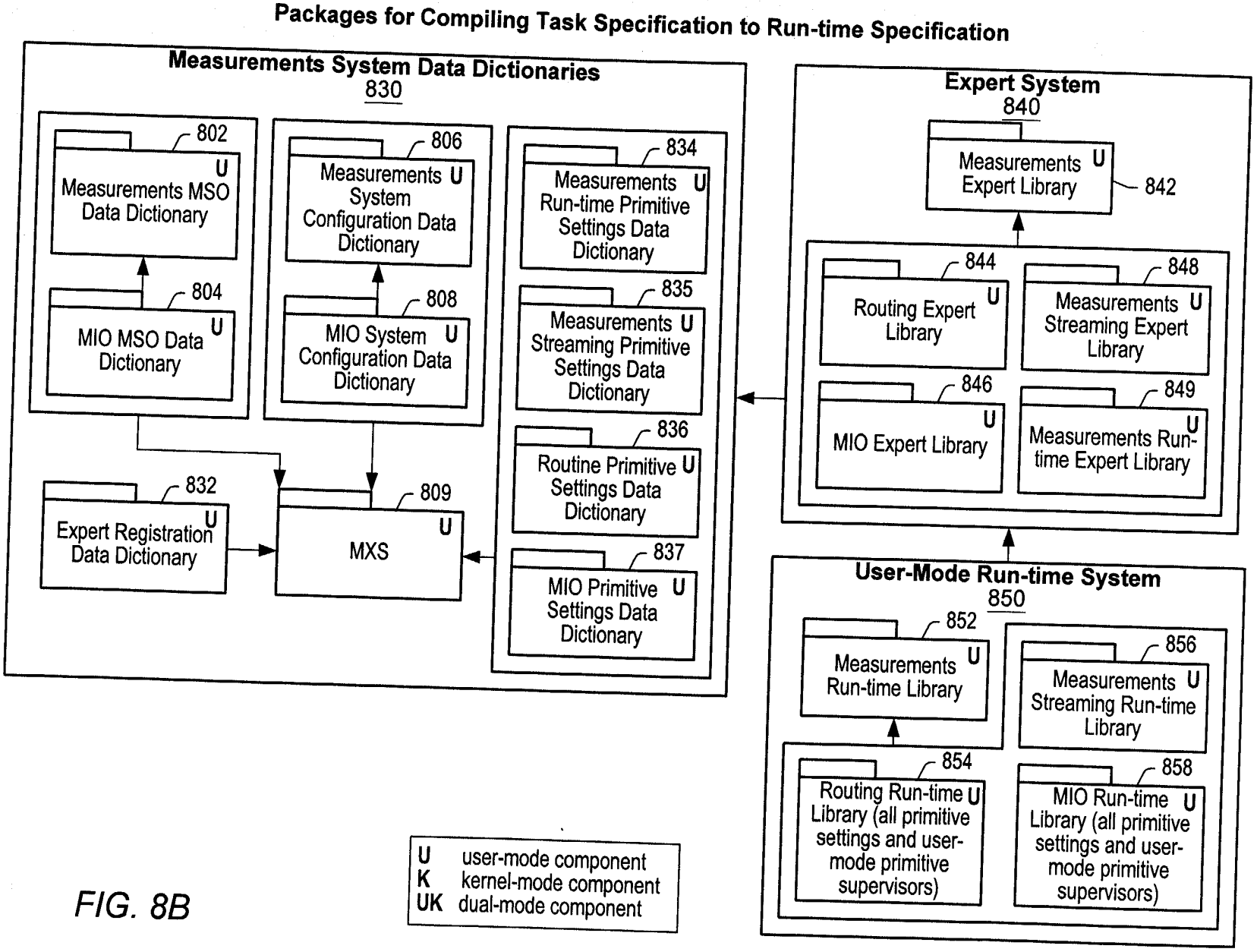

Packages for Compiling Task Specification to Run-time Specification
Measurements System Data Dictionaries
830
802
Measurements MSO Data Dictionary
U
804
MIO MSO Data Dictionary
U
806
Measurements System Configuration Data Dictionary
U
808
MIO System Configuration Data Dictionary
U
834
Measurements Run-time Primitive Settings Data Dictionary
U
835
Measurements Streaming Primitive Settings Data Dictionary
U
836
Routine Primitive Settings Data Dictionary
U
837
MIO Primitive Settings Data Dictionary
U
832
Expert Registration Data Dictionary
U
809
MXS
U
Expert System
840
Measurements Expert Library
U
842
844
Routing Expert Library
U
848
Measurements Streaming Expert Library
U
846
MIO Expert Library
U
849
Measurements Run-time Expert Library
U
User-Mode Run-time System
850
852
Measurements Run-time Library
U
856
Measurements Streaming Run-time Library
U
854
Routing Run-time Library (all primitive settings and user-mode primitive supervisors)
U
858
MIO Run-time Library (all primitive settings and user-mode primitive supervisors)
U
U user-mode component
K kernel-mode component
UK dual-mode component

FIG. 8B

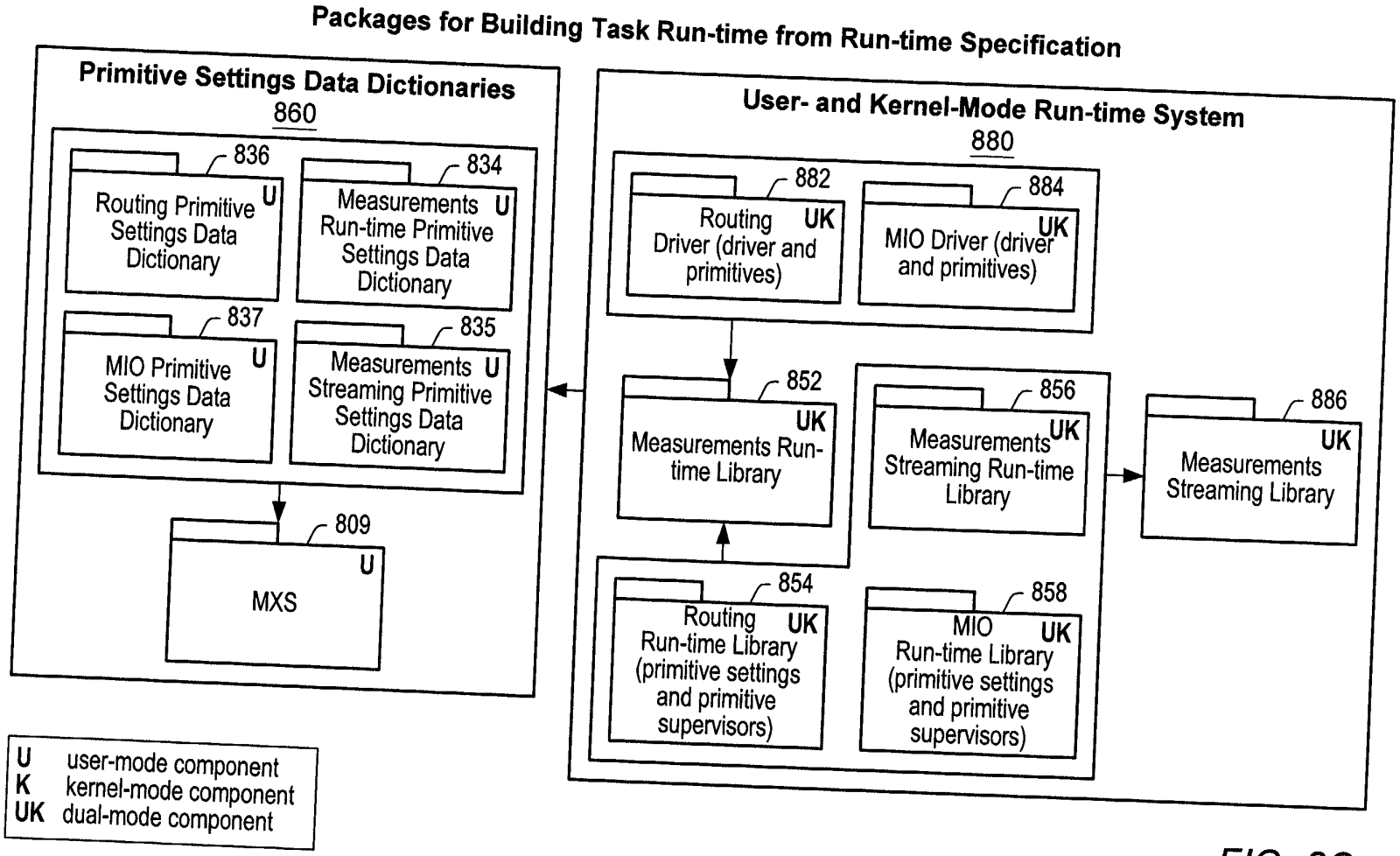

Packages for Building Task Run-time from Run-time Specification
Primitive Settings Data Dictionaries
860
836
Routing Primitive Settings Data Dictionary
U
834
Measurements Run-time Primitive Settings Data Dictionary
U
837
MIO Primitive Settings Data Dictionary
U
835
Measurements Streaming Primitive Settings Data Dictionary
U
809
MXS
U
User- and Kernel-Mode Run-time System
880
882
Routing Driver (driver and primitives)
UK
884
MIO Driver (driver and primitives)
UK
852
Measurements Run-time Library
UK
856
Measurements Streaming Run-time Library
UK
886
Measurements Streaming Library
UK
854
Routing Run-time Library (primitive settings and primitive supervisors)
UK
858
MIO Run-time Library (primitive settings and primitive supervisors)
UK
U user-mode component
K kernel-mode component
UK dual-mode component

FIG. 8C

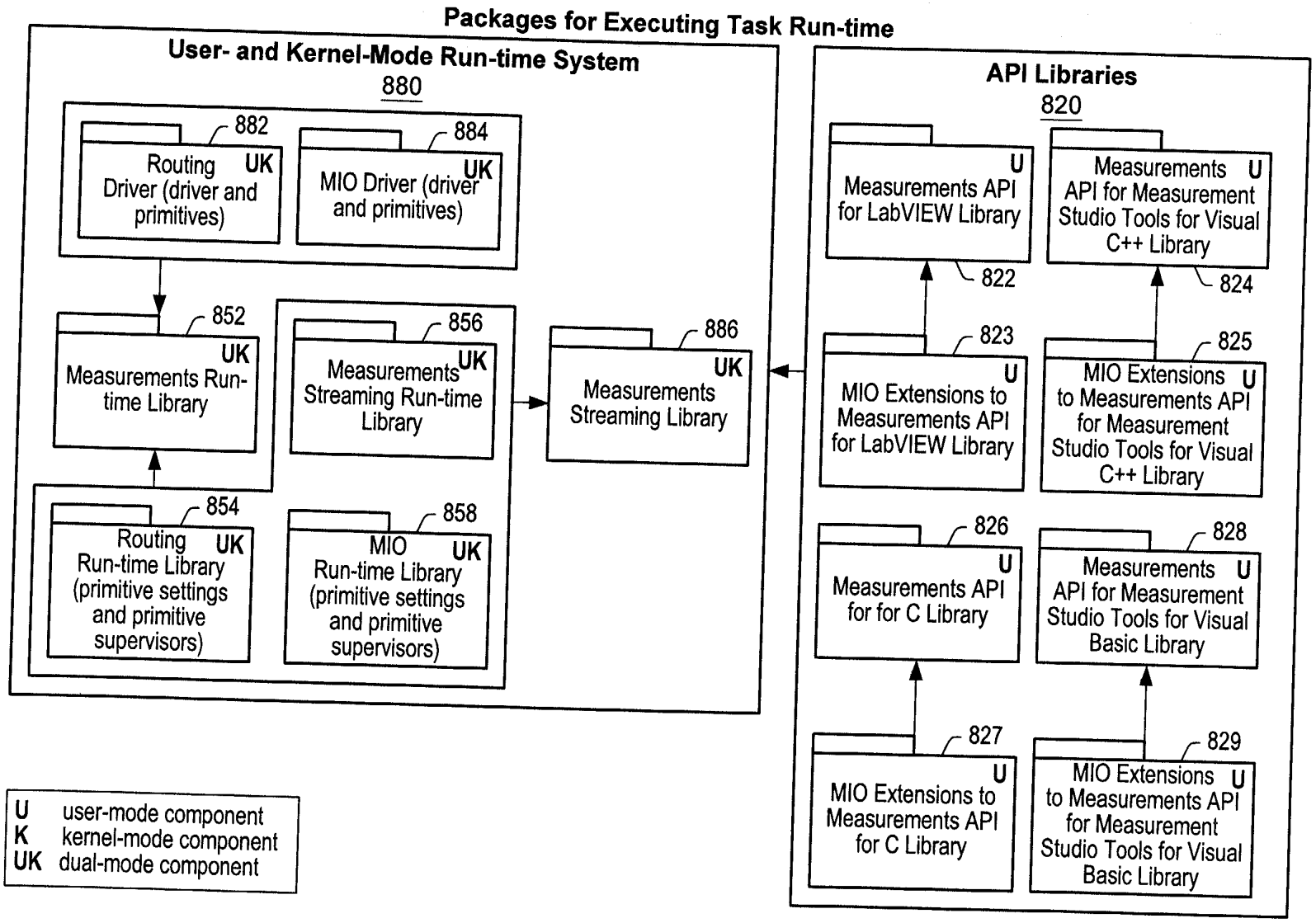

Packages for Executing Task Run-time
User- and Kernel-Mode Run-time System
880
882
Routing Driver (driver and primitives)
UK
884
MIO Driver (driver and primitives)
UK
852
Measurements Run-time Library
UK
856
Measurements Streaming Run-time Library
UK
886
Measurements Streaming Library
UK
854
Routing Run-time Library (primitive settings and primitive supervisors)
UK
858
MIO Run-time Library (primitive settings and primitive supervisors)
UK
API Libraries
820
Measurements API for LabVIEW Library
U
822
Measurements API for Measurement Studio Tools for Visual C++ Library
U
824
823
MIO Extensions to Measurements API for LabVIEW Library
U
825
MIO Extensions to Measurements API for Measurement Studio Tools for Visual C++ Library
U
826
Measurements API for for C Library
U
828
Measurements API for Measurement Studio Tools for Visual Basic Library
U
827
MIO Extensions to Measurements API for C Library
U
829
MIO Extensions to Measurements API for Measurement Studio Tools for Visual Basic Library
U
U user-mode component
K kernel-mode component
UK dual-mode component

FIG. 8D

State Diagram for Measurement Tasks

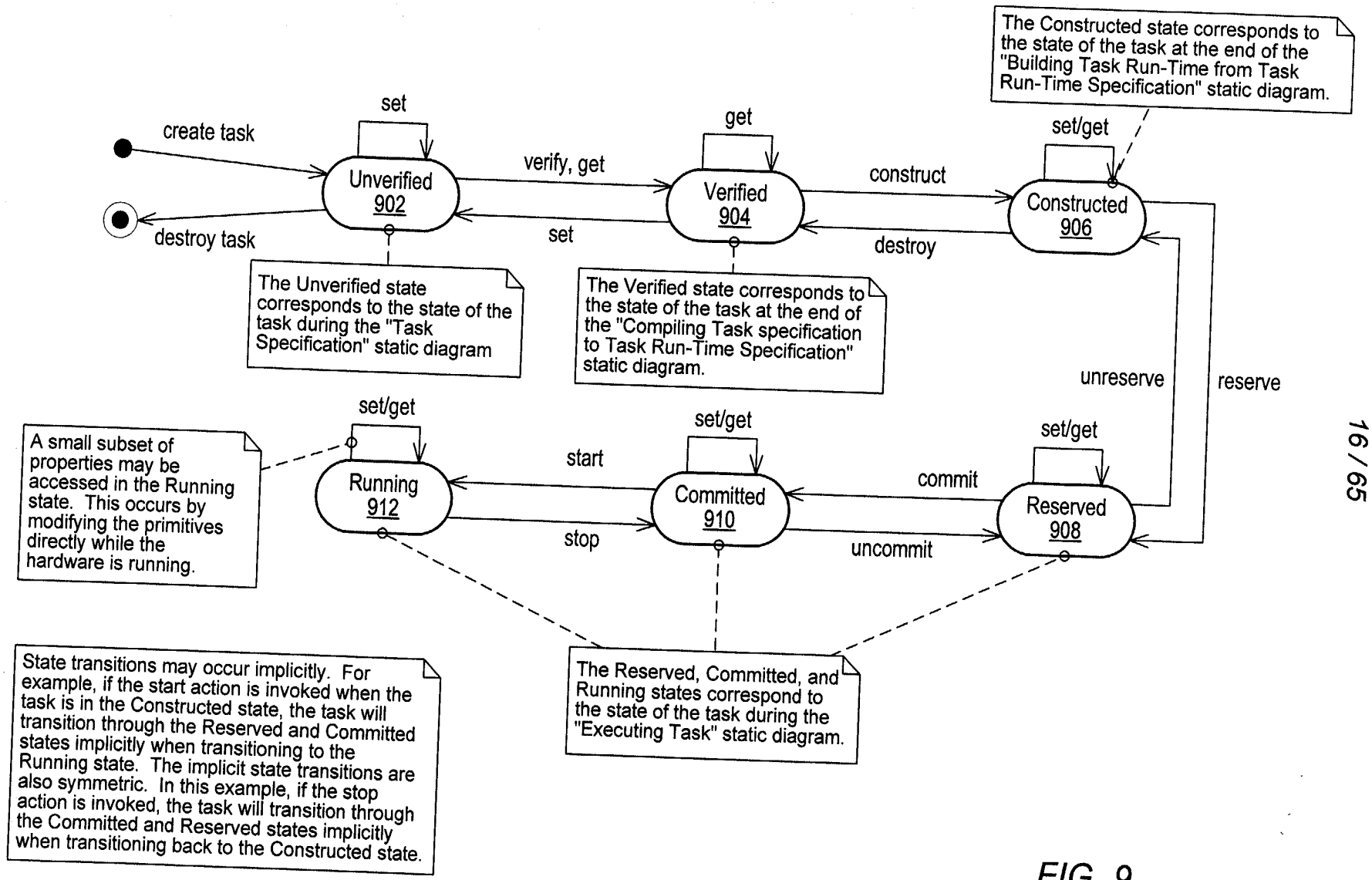


FIG. 9

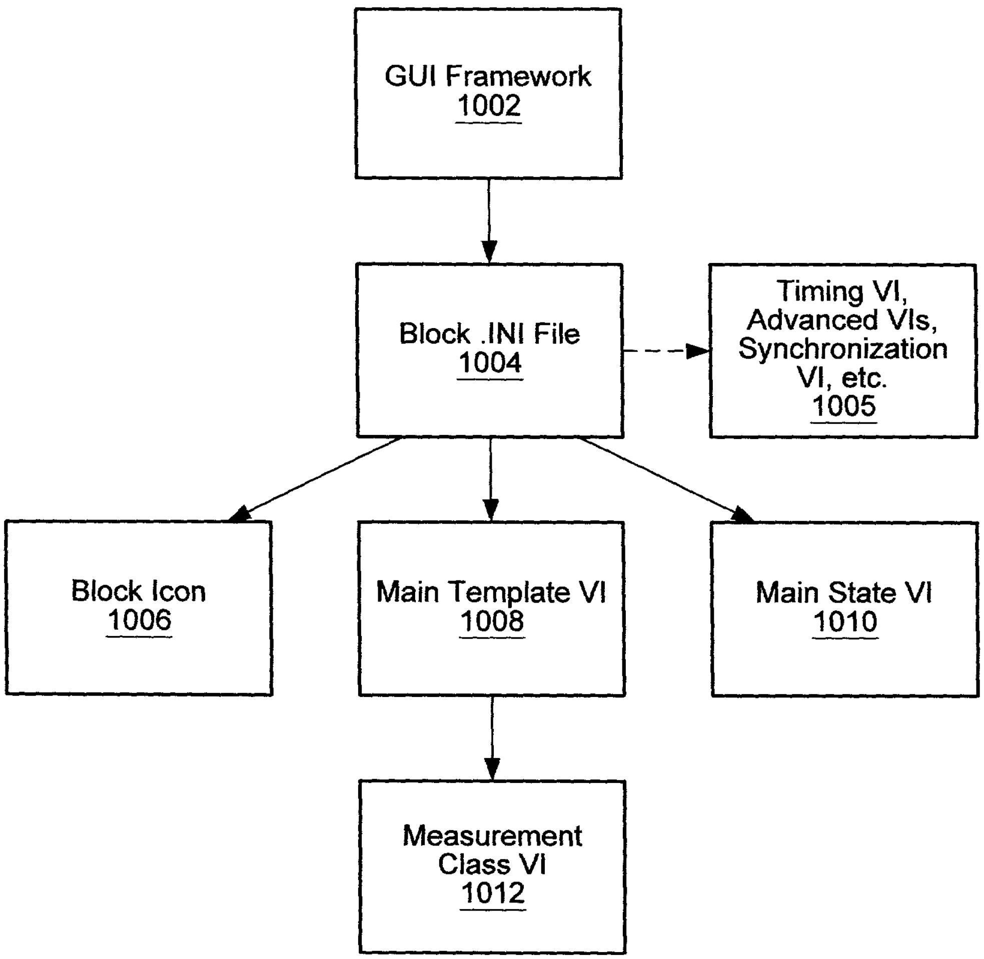

GUI Framework
1002
Block .INI File
1004
Timing VI,
Advanced VIs,
Synchronization
VI, etc.
1005
Block Icon
1006
Main Template VI
1008
Main State VI
1010
Measurement
Class VI
1012

FIG. 10

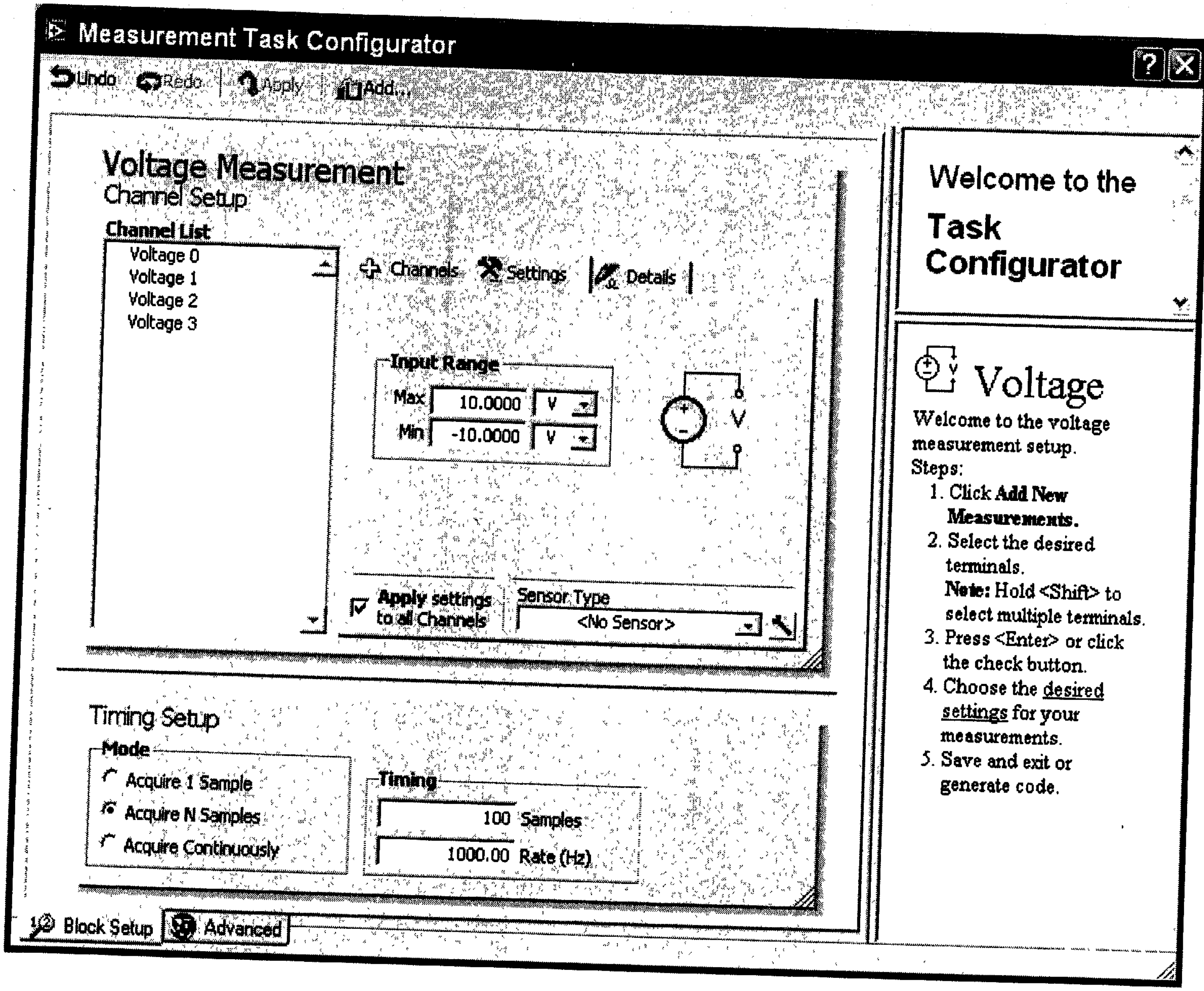

Measurement Task Configurator
Undo
Redo
Apply
Add...
Voltage Measurement
Channel Setup
Channel List
Voltage 0
Voltage 1
Voltage 2
Voltage 3
Channels
Settings
Details
Input Range
Max 10.0000 V
Min -10.0000 V
V
Apply settings to all Channels
Sensor Type
<No Sensor>
Timing Setup
Mode
Acquire 1 Sample
Acquire N Samples
Acquire Continuously
Timing
100 Samples
1000.00 Rate (Hz)
Block Setup
Advanced
Welcome to the
Task Configurator
Voltage
Welcome to the voltage measurement setup.
Steps:
1. Click Add New Measurements.
2. Select the desired terminals.
Note: Hold <Shift> to select multiple terminals.
3. Press <Enter> or click the check button.
4. Choose the desired settings for your measurements.
5. Save and exit or generate code.

FIG. 11

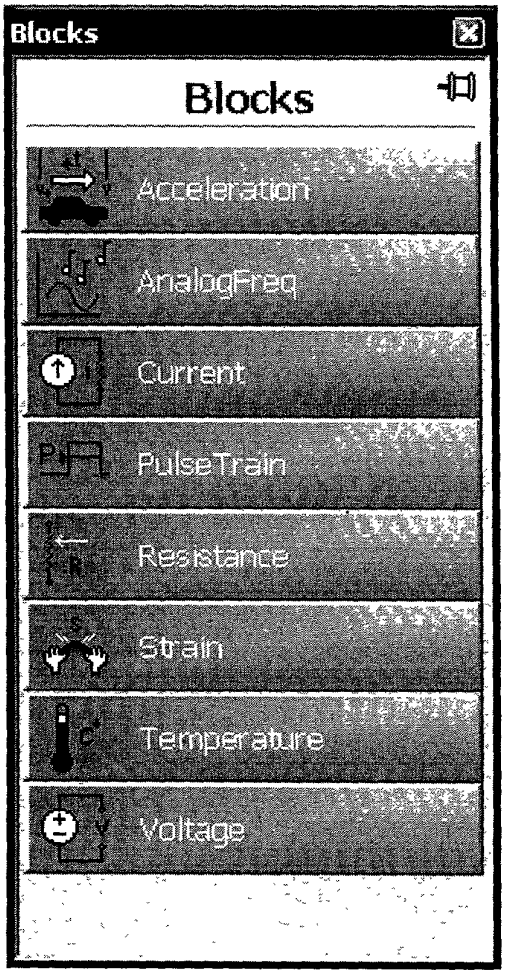


FIG. 12A

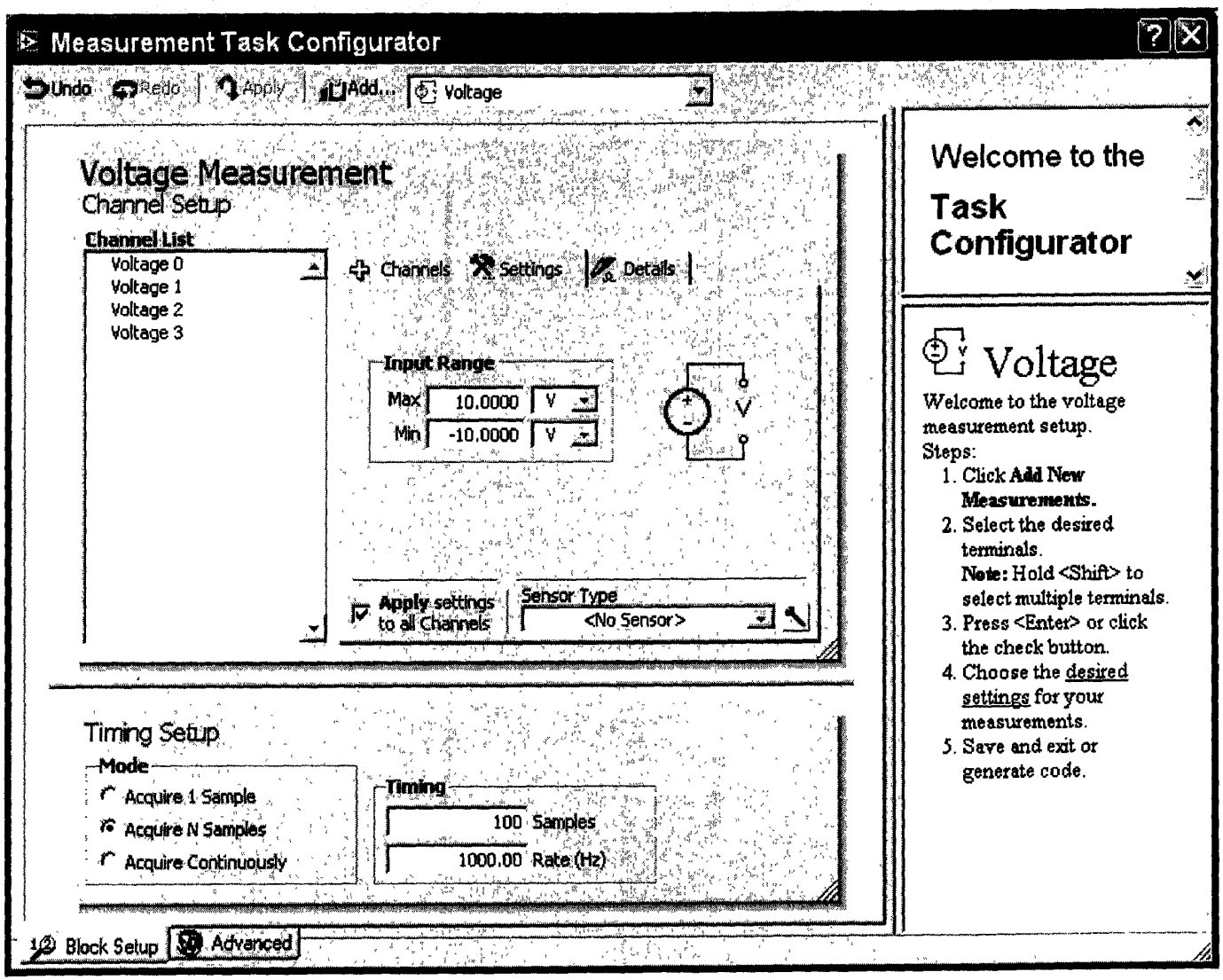

Measurement Task Configurator
Undo
Redo
Apply
Add...
Voltage
Voltage Measurement
Channel Setup
Channel List
Voltage 0
Voltage 1
Voltage 2
Voltage 3
Channels
Settings
Details
Input Range
Max
10.0000
V
Min
-10.0000
V
Apply settings to all Channels
Sensor Type
<No Sensor>
Timing Setup
Mode
Acquire 1 Sample
Acquire N Samples
Acquire Continuously
Timing
100 Samples
1000.00 Rate (Hz)
Block Setup
Advanced
Welcome to the
Task Configurator
Voltage
Welcome to the voltage measurement setup.
Steps:
1. Click Add New Measurements.
2. Select the desired terminals.
Note: Hold <Shift> to select multiple terminals.
3. Press <Enter> or click the check button.
4. Choose the desired settings for your measurements.
5. Save and exit or generate code.

FIG. 12B

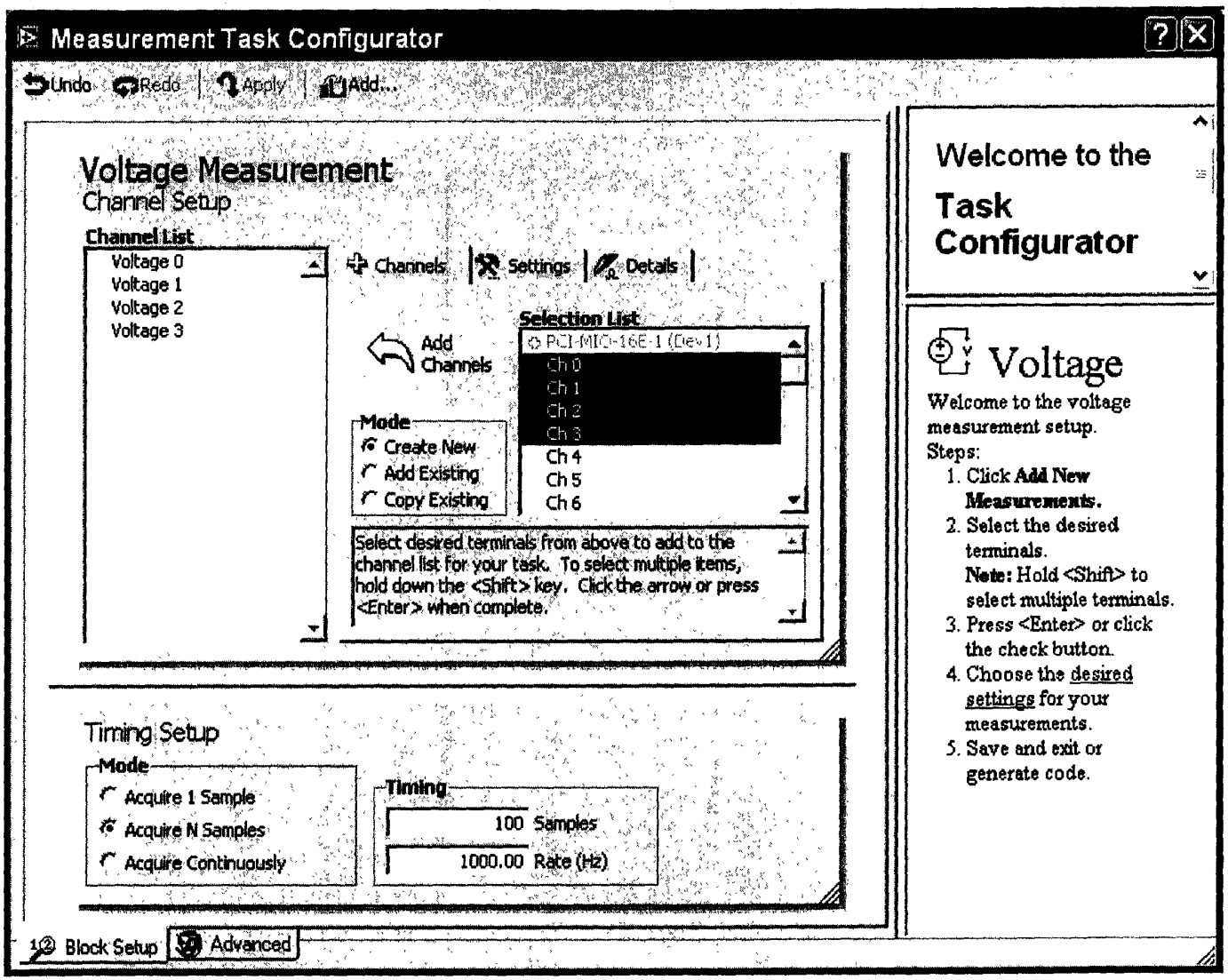

Measurement Task Configurator
Undo
Redo
Apply
Add...
Voltage Measurement
Channel Setup
Channel List
Voltage 0
Voltage 1
Voltage 2
Voltage 3
Channels
Settings
Details
Add Channels
Selection List
PCI-MIO-16E-1 (Dev1)
Ch 0
Ch 1
Ch 2
Ch 3
Ch 4
Ch 5
Ch 6
Mode
Create New
Add Existing
Copy Existing
Select desired terminals from above to add to the channel list for your task. To select multiple items, hold down the <Shift> key. Click the arrow or press <Enter> when complete.
Timing Setup
Mode
Acquire 1 Sample
Acquire N Samples
Acquire Continuously
Timing
100 Samples
1000.00 Rate (Hz)
Block Setup
Advanced
Welcome to the
Task Configurator
Voltage
Welcome to the voltage measurement setup.
Steps:
1. Click Add New Measurements.
2. Select the desired terminals.
Note: Hold <Shift> to select multiple terminals.
3. Press <Enter> or click the check button.
4. Choose the desired settings for your measurements.
5. Save and exit or generate code.

FIG. 12C

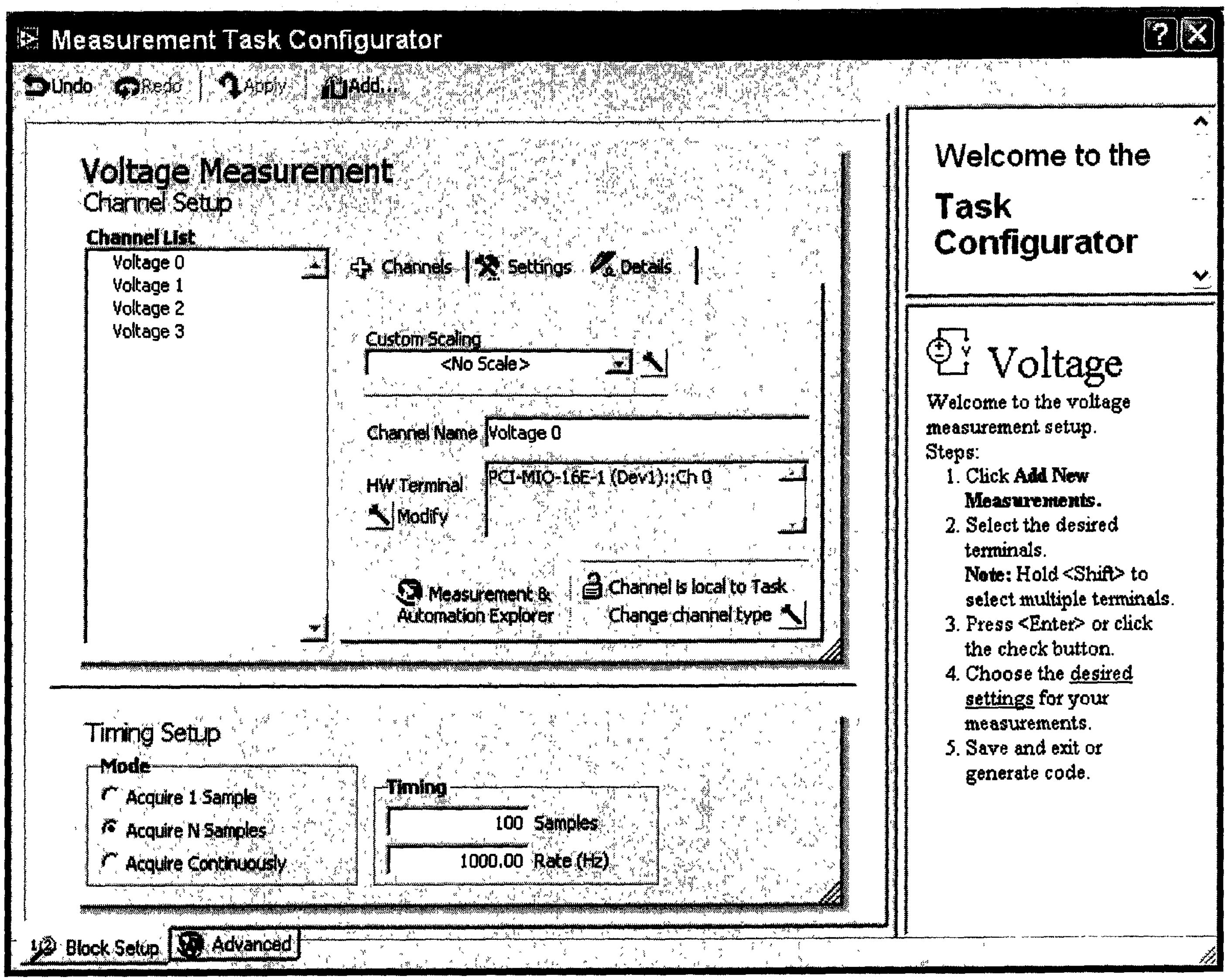

Measurement Task Configurator
Undo
Redo
Apply
Add...
Voltage Measurement
Channel Setup
Channel List
Voltage 0
Voltage 1
Voltage 2
Voltage 3
Channels
Settings
Details
Custom Scaling
<No Scale>
Channel Name
Voltage 0
HW Terminal
PCI-MIO-16E-1 (Dev1)::Ch 0
Modify
Measurement & Automation Explorer
Channel is local to Task
Change channel type
Timing Setup
Mode
Acquire 1 Sample
Acquire N Samples
Acquire Continuously
Timing
100 Samples
1000.00 Rate (Hz)
Block Setup
Advanced
Welcome to the Task Configurator
Voltage
Welcome to the voltage measurement setup.
Steps:
1. Click Add New Measurements.
2. Select the desired terminals.
Note: Hold <Shift> to select multiple terminals.
3. Press <Enter> or click the check button.
4. Choose the desired settings for your measurements.
5. Save and exit or generate code.

FIG. 12D

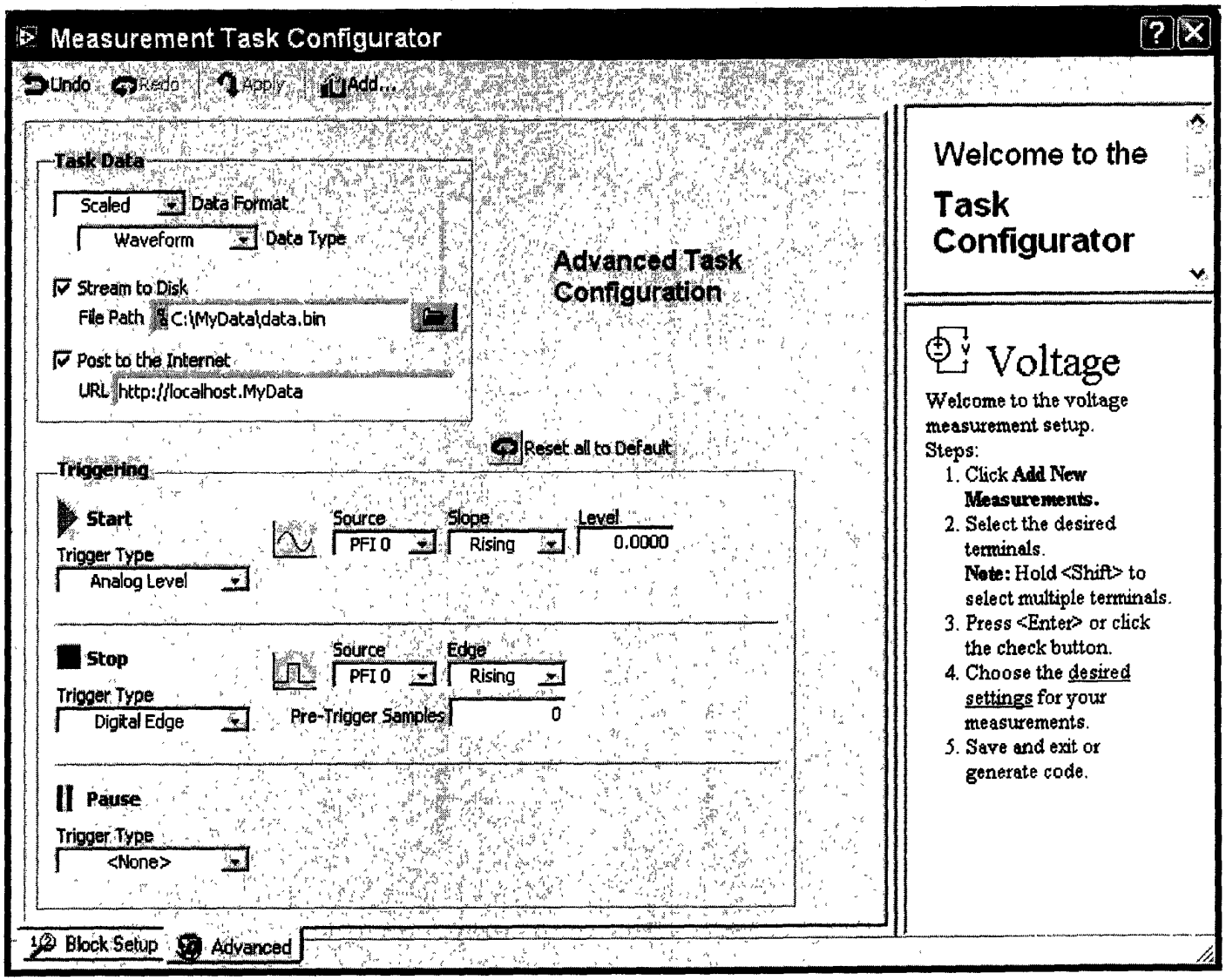

Measurement Task Configurator
Undo
Redo
Apply
Add...
Task Data
Scaled
Data Format
Waveform
Data Type
Stream to Disk
File Path
C:\MyData\data.bin
Post to the Internet
URL
http://localhost.MyData
Advanced Task Configuration
Reset all to Default
Triggering
Start
Trigger Type
Analog Level
Source
PFI 0
Slope
Rising
Level
0.0000
Stop
Trigger Type
Digital Edge
Source
PFI 0
Edge
Rising
Pre-Trigger Samples
0
Pause
Trigger Type
<None>
Block Setup
Advanced
Welcome to the
Task Configurator
Voltage
Welcome to the voltage measurement setup.
Steps:
1. Click Add New Measurements.
2. Select the desired terminals.
Note: Hold <Shift> to select multiple terminals.
3. Press <Enter> or click the check button.
4. Choose the desired settings for your measurements.
5. Save and exit or generate code.

FIG. 13

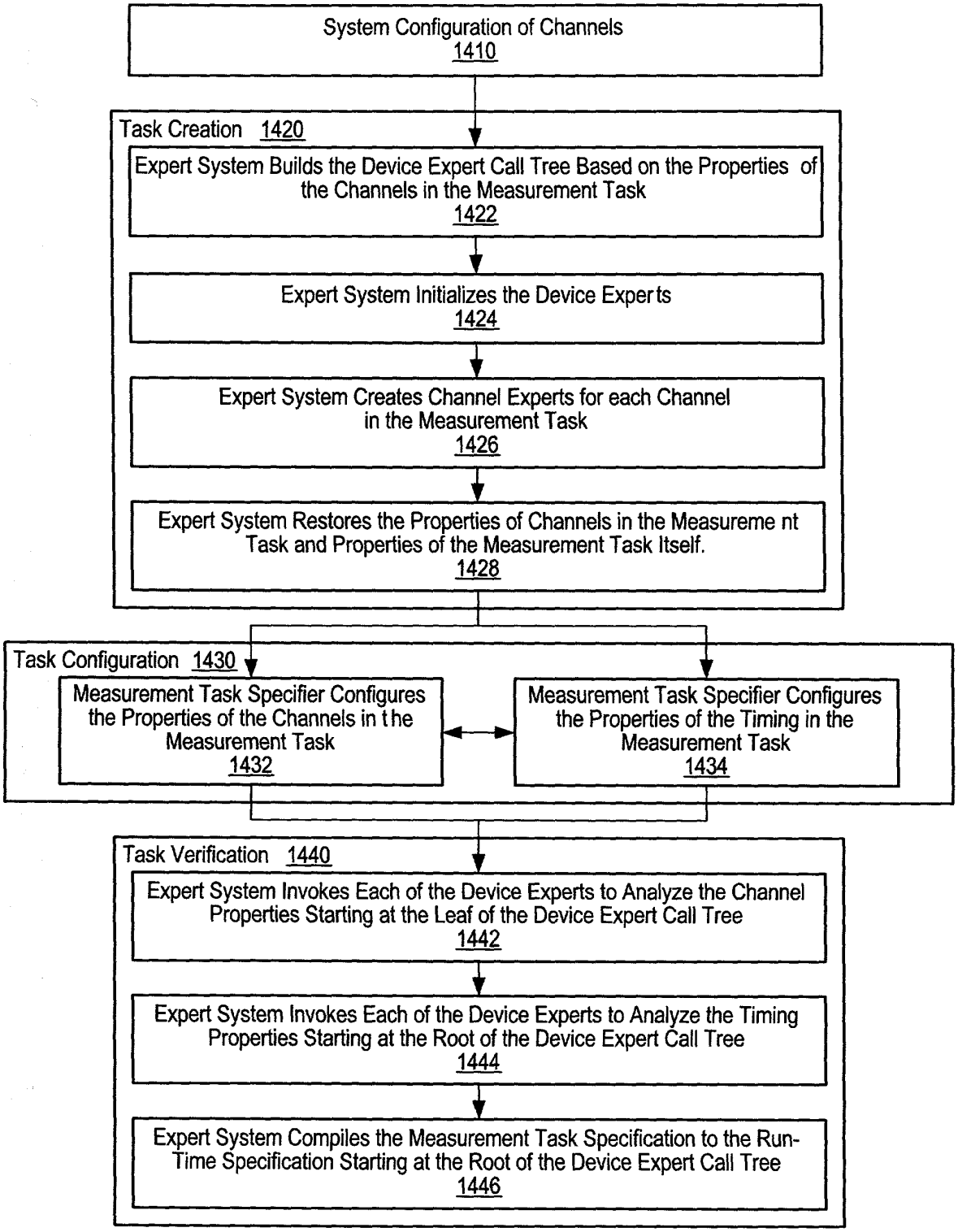


FIG. 14

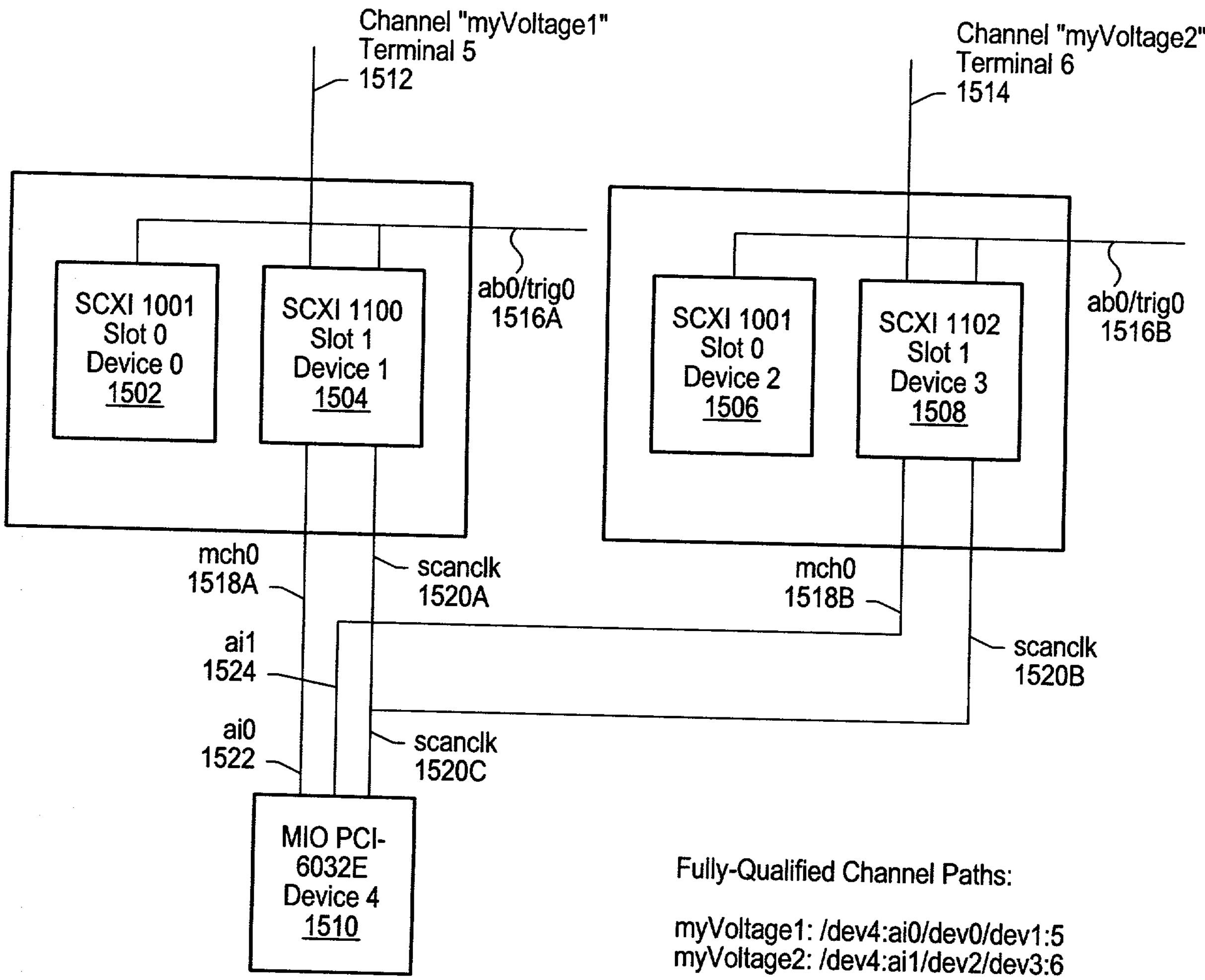
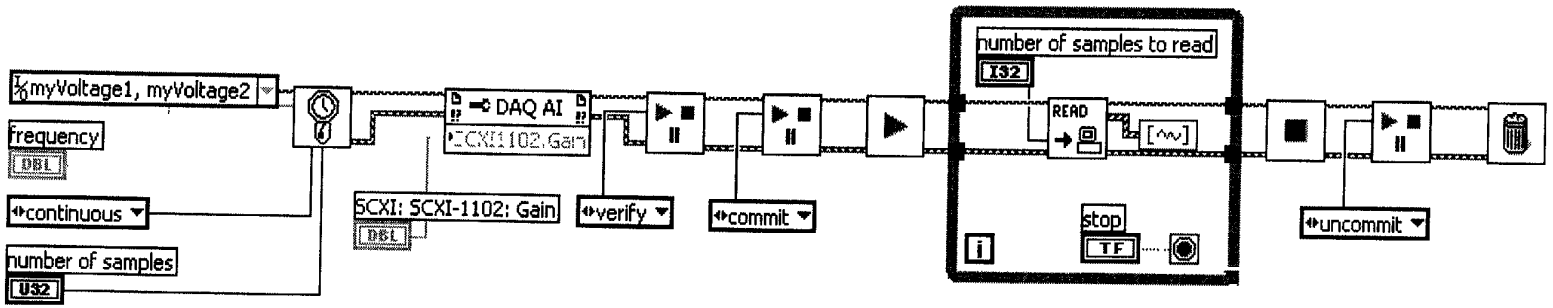
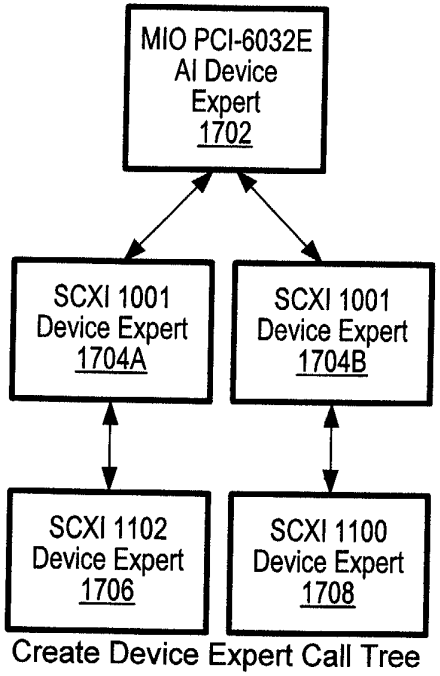

Channel "myVoltage1"
Terminal 5
1512
Channel "myVoltage2"
Terminal 6
1514
SCXI 1001
Slot 0
Device 0
1502
SCXI 1100
Slot 1
Device 1
1504
ab0/trig0
1516A
SCXI 1001
Slot 0
Device 2
1506
SCXI 1102
Slot 1
Device 3
1508
ab0/trig0
1516B
mch0
1518A
scanclk
1520A
mch0
1518B
ai1
1524
scanclk
1520B
ai0
1522
scanclk
1520C
MIO PCI-
6032E
Device 4
1510
Fully-Qualified Channel Paths:
myVoltage1: /dev4:ai0/dev0/dev1:5
myVoltage2: /dev4:ai1/dev2/dev3:6

FIG. 15



Voltage On Two Channels with Two SCXI Modules in Two SCXI Chassis Connected to an MIO DAQ Device

FIG. 16



Create Device Expert Call Tree

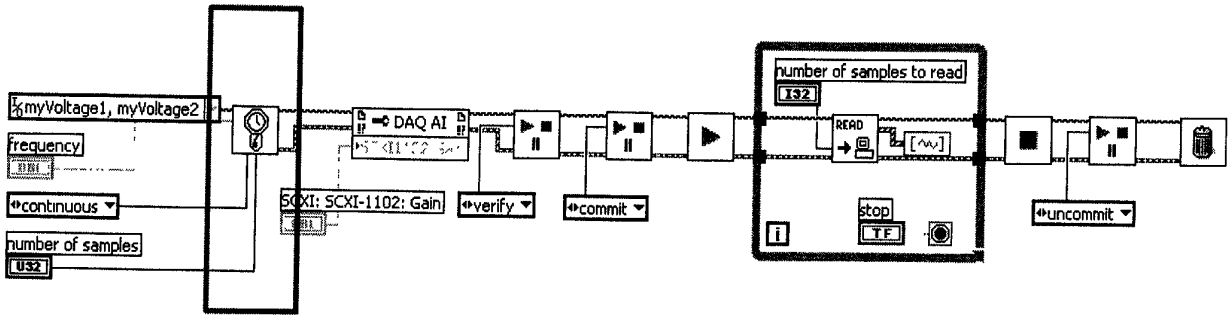


FIG. 17

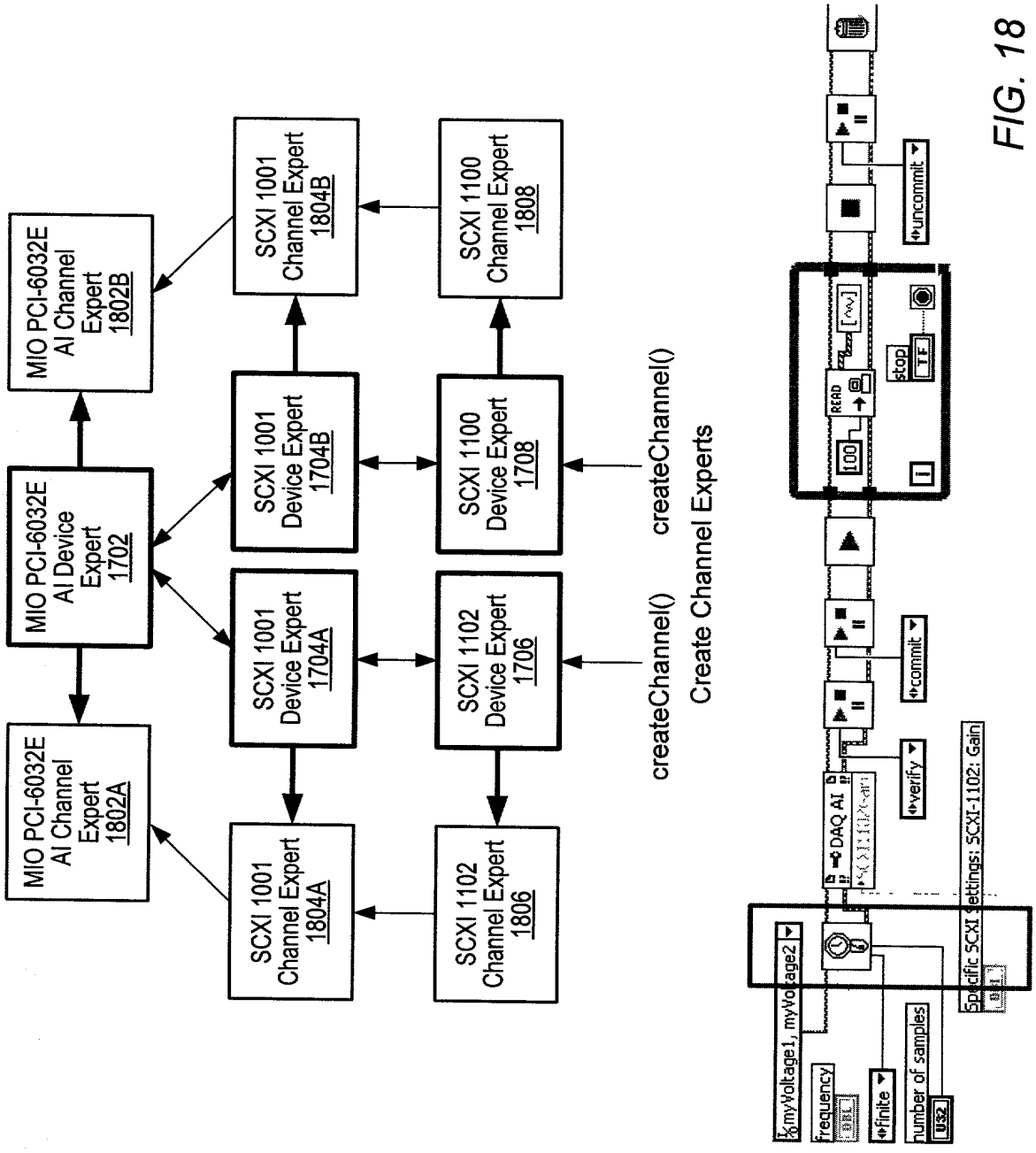

MIO PCI-6032E AI Channel Expert 1802A
MIO PCI-6032E AI Device Expert 1702
MIO PCI-6032E AI Channel Expert 1802B
SCXI 1001 Channel Expert 1804A
SCXI 1001 Device Expert 1704A
SCXI 1001 Device Expert 1704B
SCXI 1001 Channel Expert 1804B
SCXI 1102 Channel Expert 1806
SCXI 1102 Device Expert 1706
SCXI 1100 Device Expert 1708
SCXI 1100 Channel Expert 1808
createChannel()
createChannel()
Create Channel Experts
myVoltage1, myVoltage2
frequency
finite
number of samples
DAQ AI
verify
commit
uncommit
READ
stop
Specific SCXI settings: SCXI-1102: Gain

FIG. 18

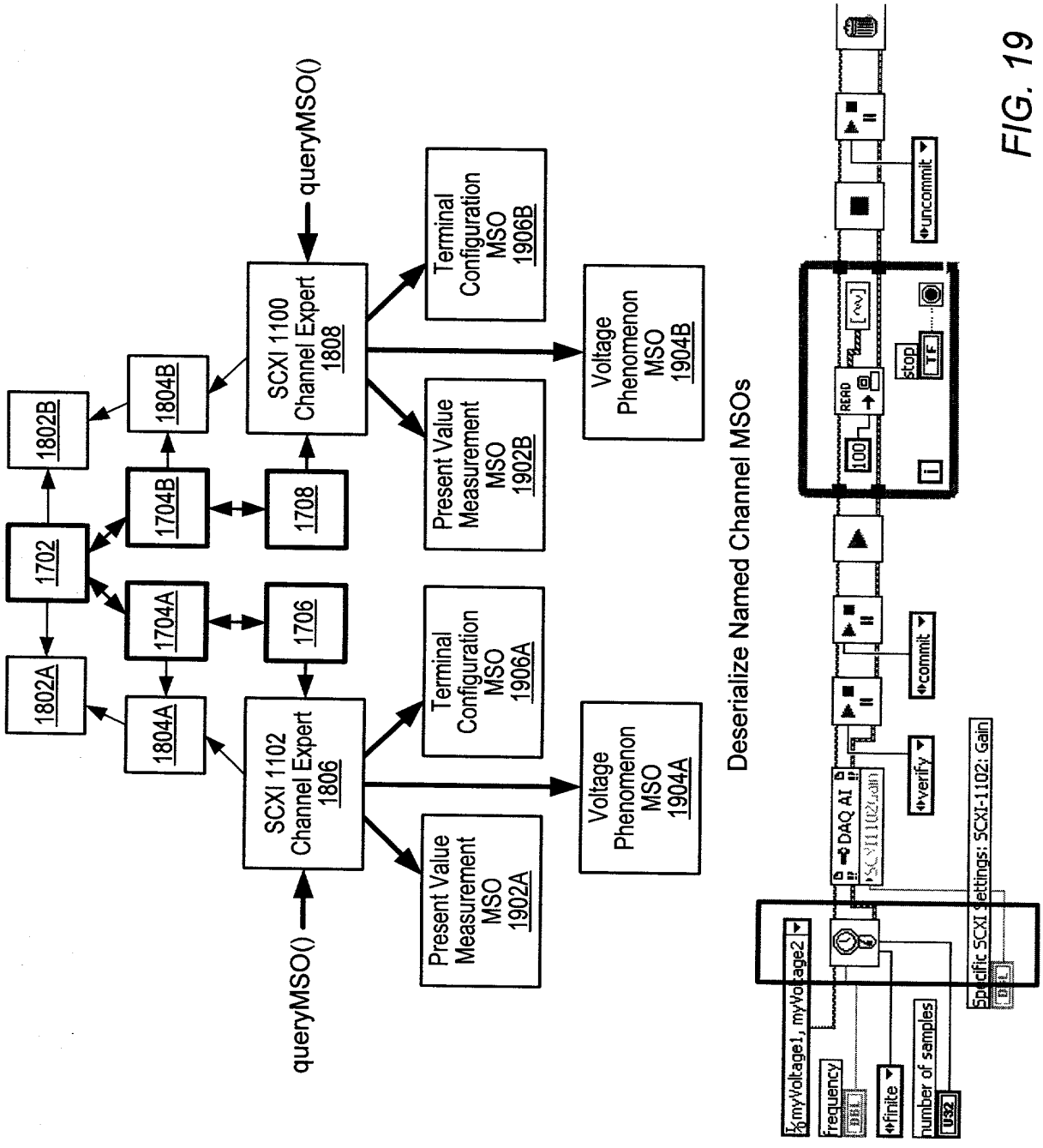

queryMSO()
SCXI 1102
Channel Expert
1806
1802A
1804A
1704A
1706
1702
1704B
1708
1804B
1802B
SCXI 1100
Channel Expert
1808
queryMSO()
Present Value
Measurement
MSO
1902A
Terminal
Configuration
MSO
1906A
Voltage
Phenomenon
MSO
1904A
Present Value
Measurement
MSO
1902B
Terminal
Configuration
MSO
1906B
Voltage
Phenomenon
MSO
1904B
Deserialize Named Channel MSOs
myVoltage1, myVoltage2
frequency
finite
number of samples
DAQ AI
commit
verify
Specific SCXI Settings: SCXI-1102: Gain
READ
stop
uncommit

FIG. 19

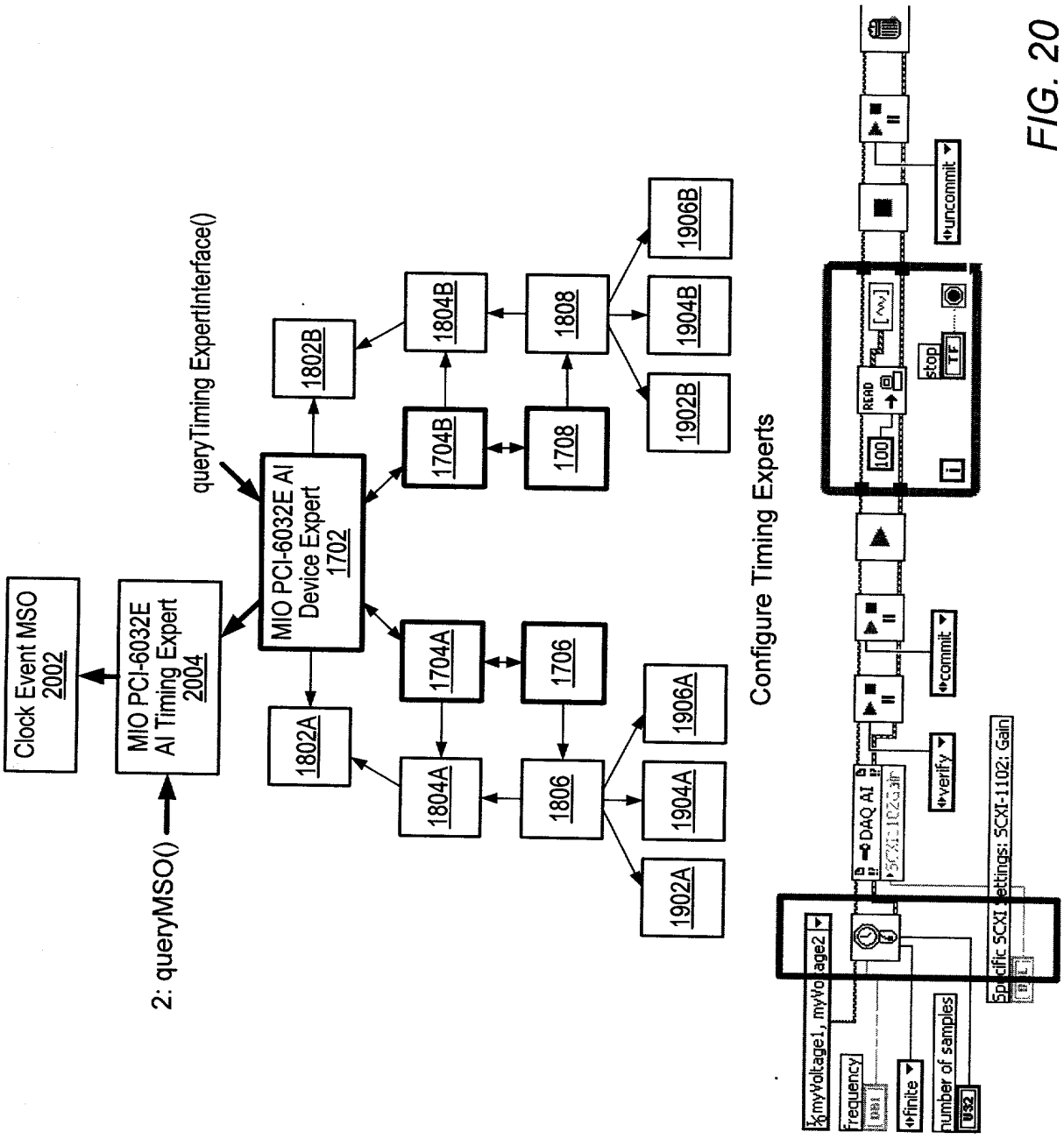

Clock Event MSO
2002
MIO PCI-6032E
AI Timing Expert
2004
2: queryMSO()
queryTiming ExpertInterface()
MIO PCI-6032E AI
Device Expert
1702
1802A
1802B
1704A
1704B
1706
1708
1804A
1804B
1806
1808
1902A
1904A
1906A
1902B
1904B
1906B
Configure Timing Experts
myVoltage1, myVoltage2
Frequency
finite
number of samples
DAQ AI
verify
commit
uncommit
READ
stop
Specific SCXI settings: SCXI-1102: Gain

FIG. 20

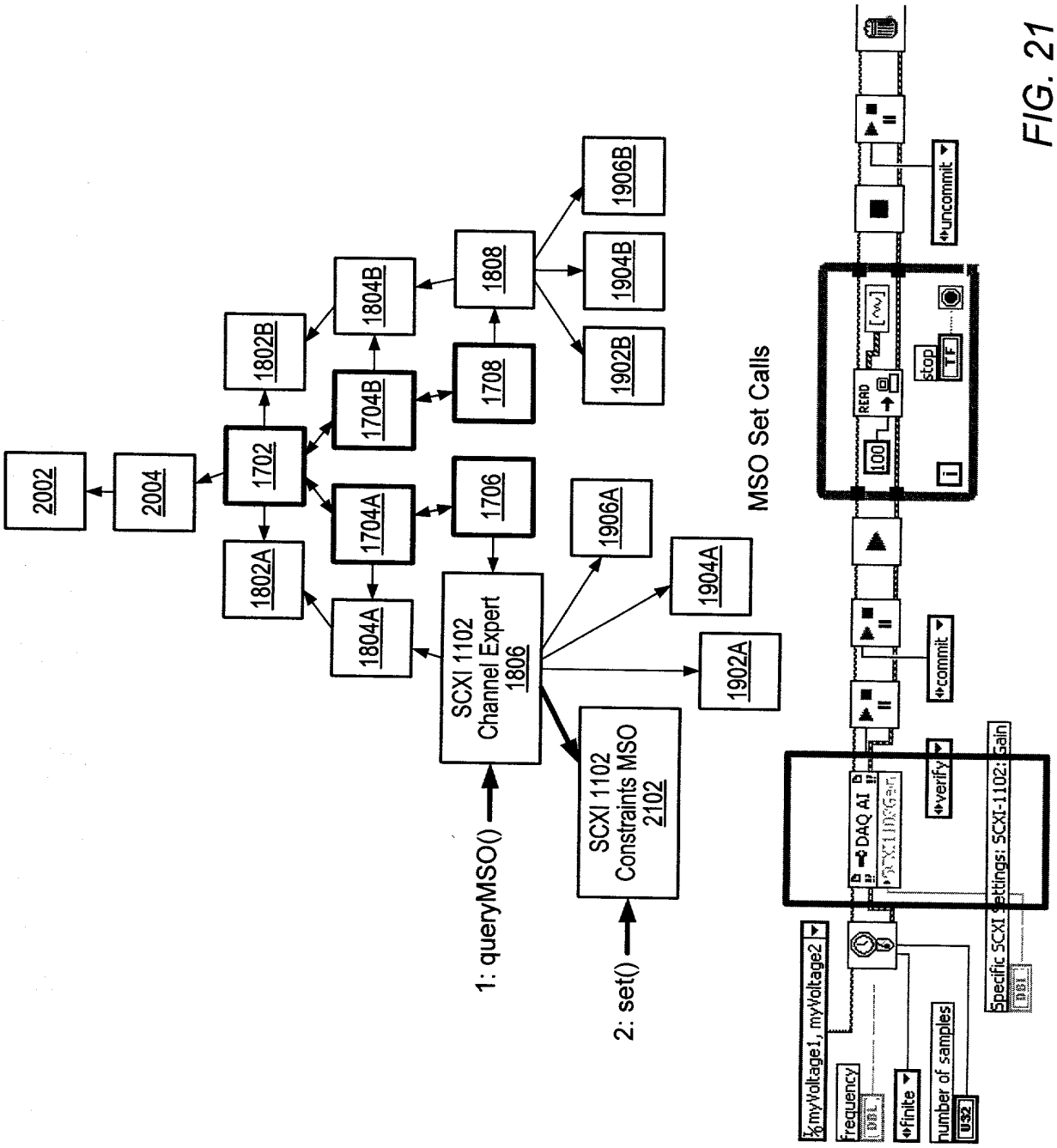
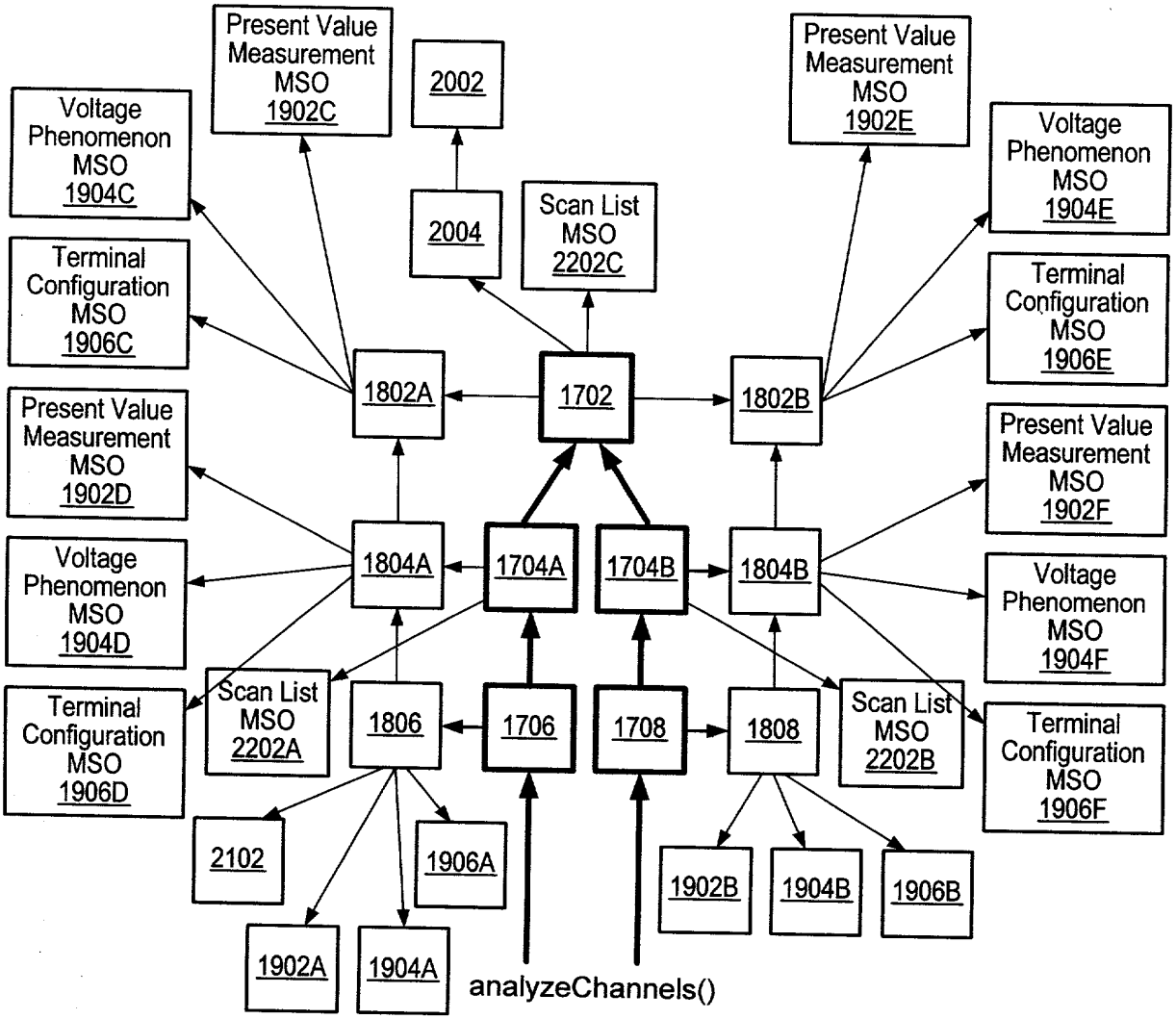

2002
2004
1702
1802A
1802B
1804A
1804B
1704A
1704B
1706
1708
1808
1902A
1902B
1904A
1904B
1906A
1906B
SCXI 1102
Channel Expert
1806
SCXI 1102
Constraints MSO
2102
1: queryMSO()
2: set()
MSO Set Calls
DAQ AI
commit
verify
uncommit
READ
stop
100
myVoltage1, myVoltage2
frequency
finite
number of samples
Specific SCXI Settings: SCXI-1102: Gain

FIG. 21



Analyze Channels

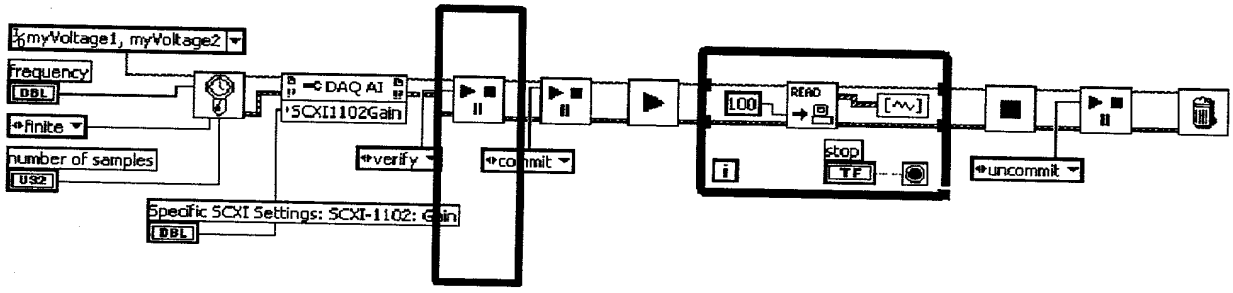
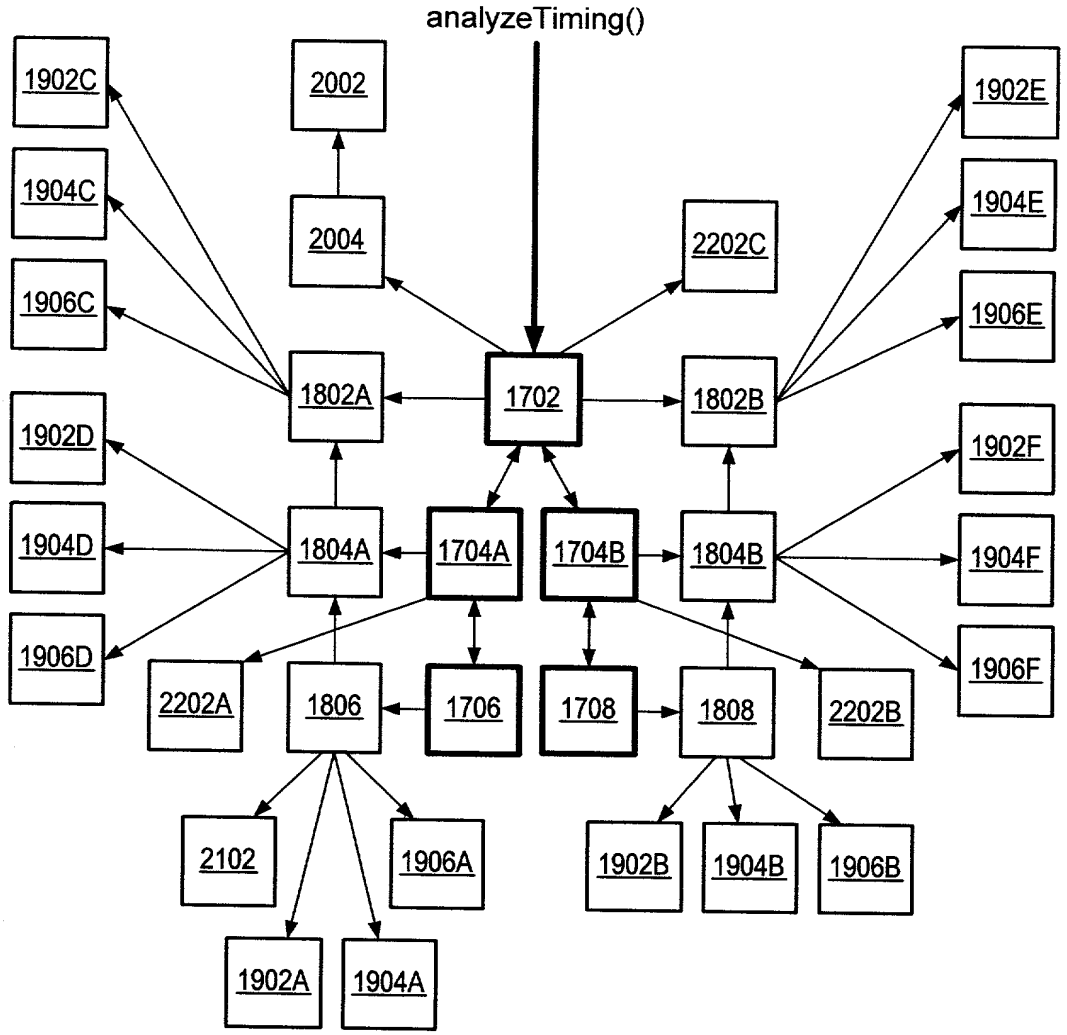


FIG. 22



Analyze Timing

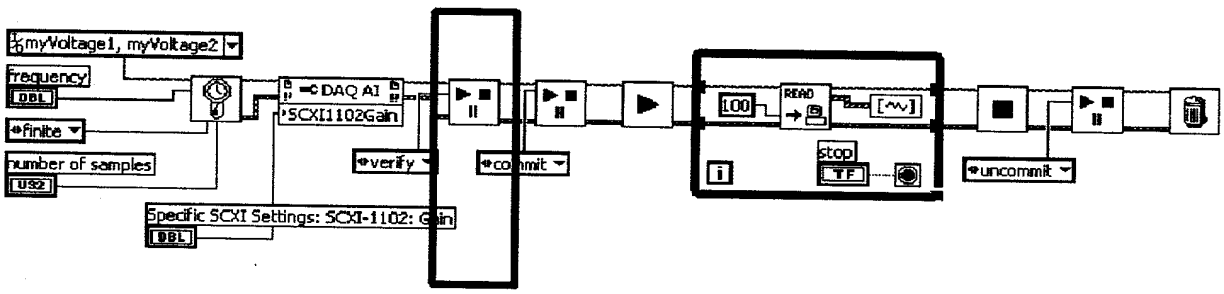


FIG. 23

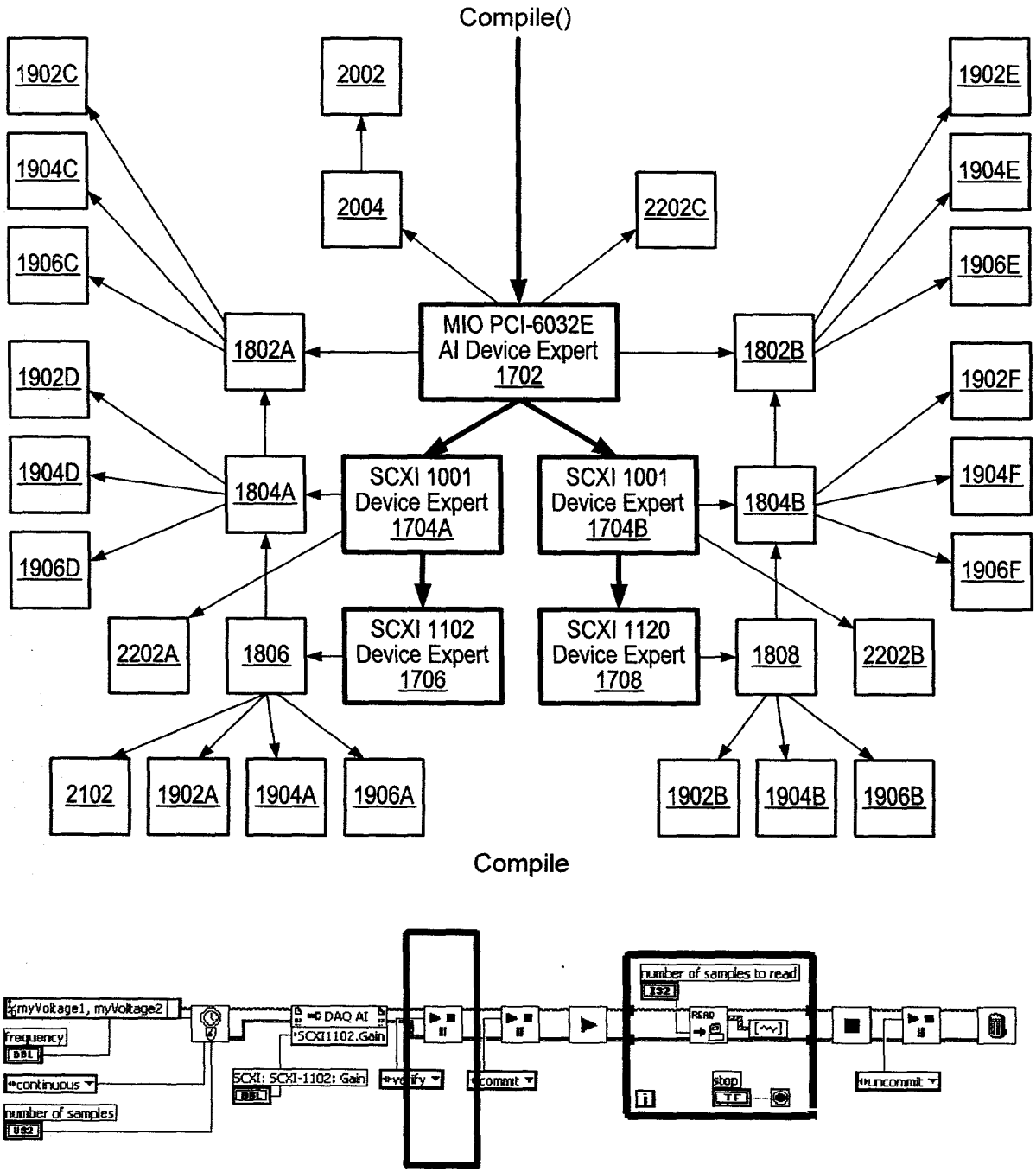
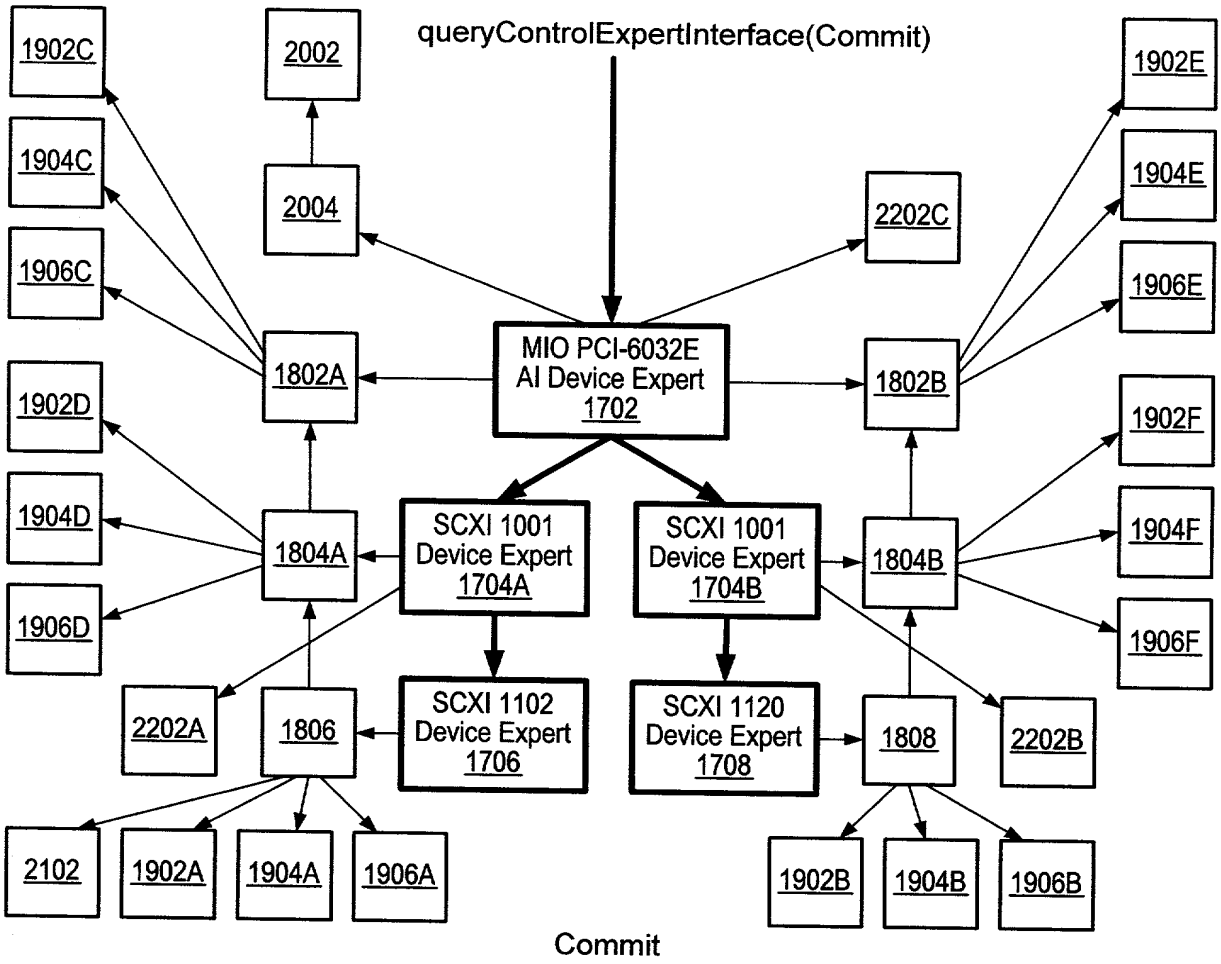

Compile()
1902C
2002
1902E
1904C
2004
2202C
1904E
1906C
1906E
1802A
MIO PCI-6032E
AI Device Expert
1702
1802B
1902D
1902F
1904D
1804A
SCXI 1001
Device Expert
1704A
SCXI 1001
Device Expert
1704B
1804B
1904F
1906D
1906F
2202A
1806
SCXI 1102
Device Expert
1706
SCXI 1120
Device Expert
1708
1808
2202B
2102
1902A
1904A
1906A
1902B
1904B
1906B
Compile
myVoltage1, myVoltage2
frequency
DBL
continuous
number of samples
U32
DAQ AI
SCXI1102.Gain
SCXI: SCXI-1102: Gain
DBL
verify
commit
number of samples to read
U32
READ
stop
TF
uncommit

FIG. 24A


queryControlExpertInterface(Commit)
1902C
2002
1902E
1904C
2004
2202C
1904E
1906C
1906E
MIO PCI-6032E
AI Device Expert
1702
1802A
1802B
1902D
1902F
1904D
SCXI 1001
Device Expert
1704A
SCXI 1001
Device Expert
1704B
1804A
1804B
1904F
1906D
1906F
2202A
1806
SCXI 1102
Device Expert
1706
SCXI 1120
Device Expert
1708
1808
2202B
2102
1902A
1904A
1906A
1902B
1904B
1906B
Commit

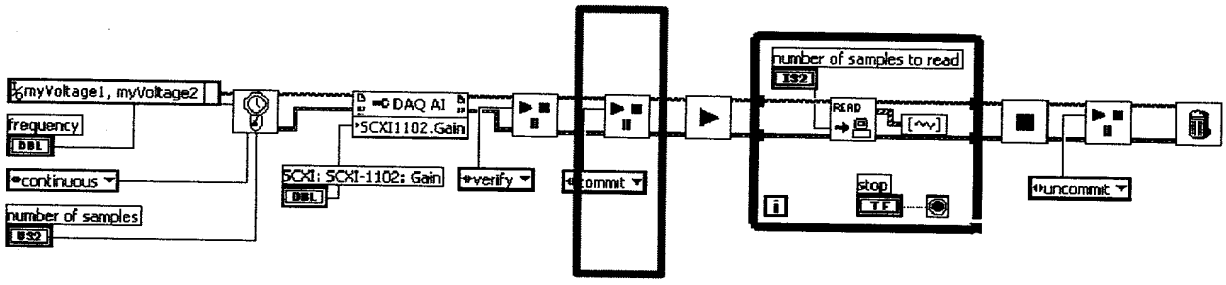
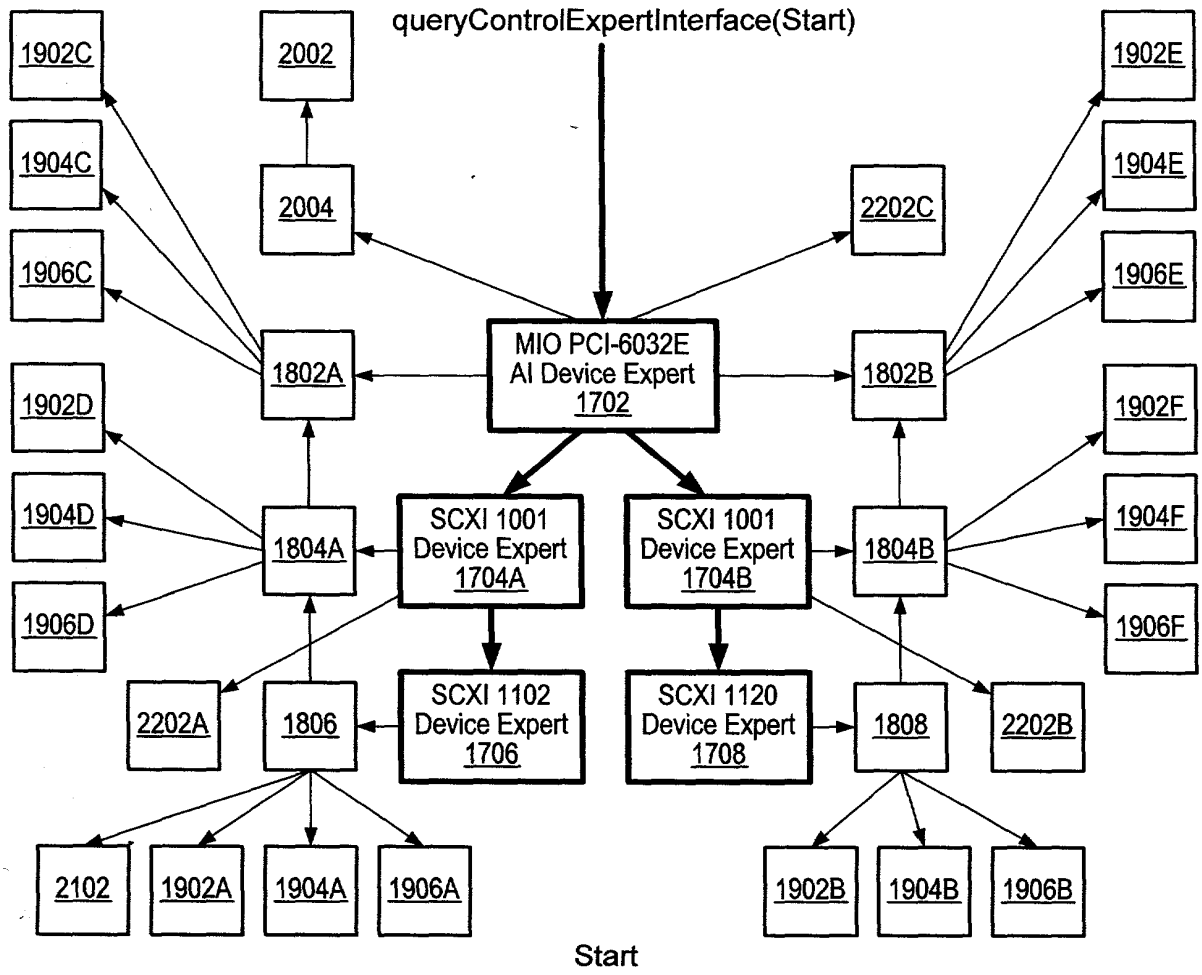

myVoltage1, myVoltage2
frequency
DBL
continuous
number of samples
I32
DAQ AI
SCXI1102.Gain
SCXI::SCXI-1102::Gain
DBL
verify
commit
number of samples to read
I32
READ
stop
TF
uncommit

FIG. 24B


queryControlExpertInterface(Start)
1902C
2002
1902E
1904C
2004
2202C
1904E
1906C
1906E
1802A
MIO PCI-6032E
AI Device Expert
1702
1802B
1902D
1902F
1904D
1804A
SCXI 1001
Device Expert
1704A
SCXI 1001
Device Expert
1704B
1804B
1904F
1906D
1906F
2202A
1806
SCXI 1102
Device Expert
1706
SCXI 1120
Device Expert
1708
1808
2202B
2102
1902A
1904A
1906A
1902B
1904B
1906B
Start

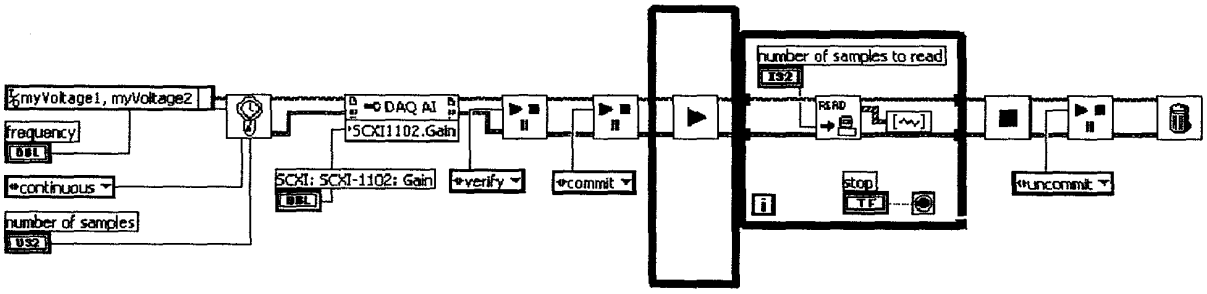
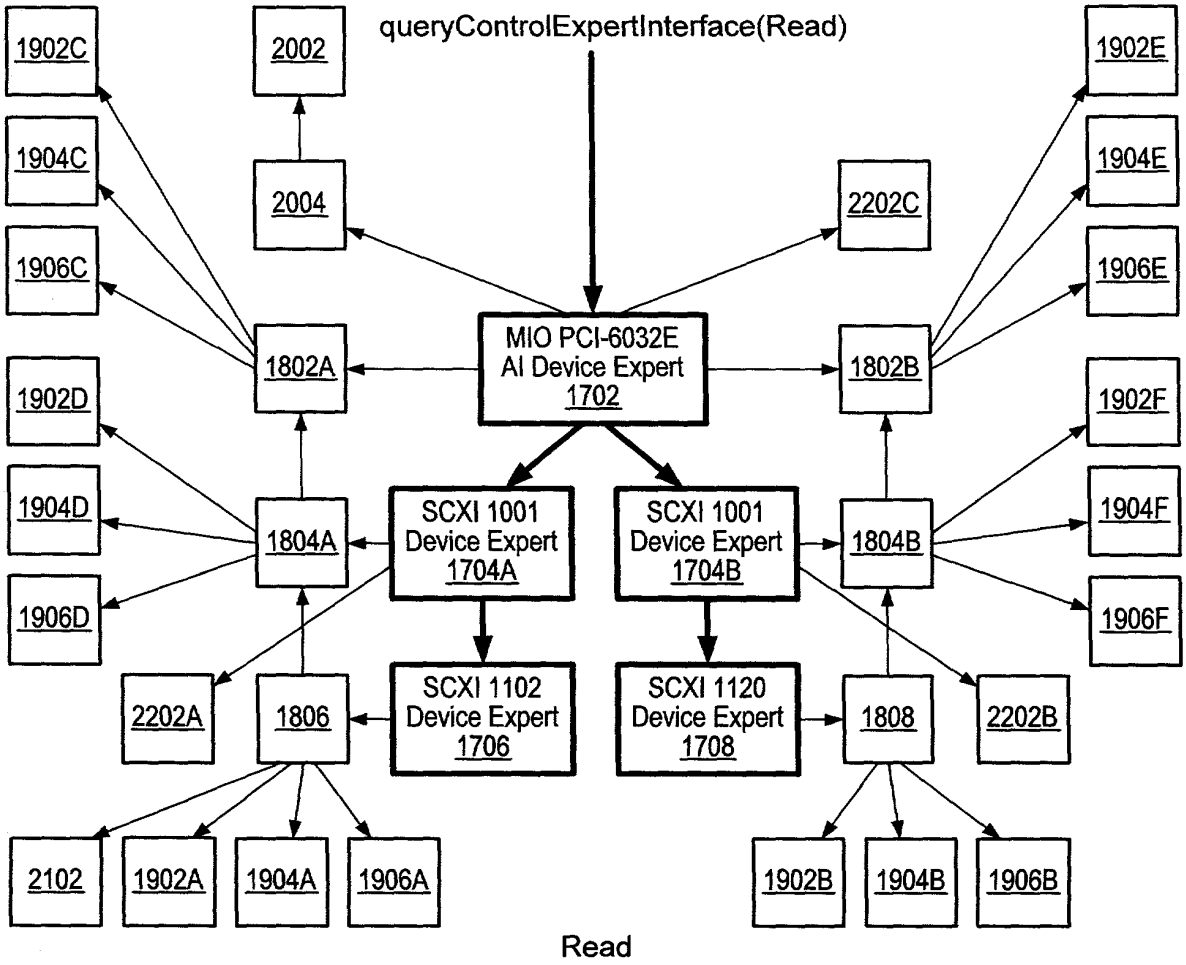

myVoltage1, myVoltage2
frequency
DBL
continuous
number of samples
U32
DAQ AI
SCXI1102.Gain
SCXI: SCXI-1102: Gain
DBL
verify
commit
number of samples to read
I32
READ
stop
TF
uncommit

FIG. 24C


queryControlExpertInterface(Read)
1902C
2002
1902E
1904C
2004
2202C
1904E
1906C
1906E
1802A
MIO PCI-6032E
AI Device Expert
1702
1802B
1902D
1902F
1904D
SCXI 1001
Device Expert
1704A
SCXI 1001
Device Expert
1704B
1904F
1804A
1804B
1906D
1906F
2202A
1806
SCXI 1102
Device Expert
1706
SCXI 1120
Device Expert
1708
1808
2202B
2102
1902A
1904A
1906A
1902B
1904B
1906B
Read

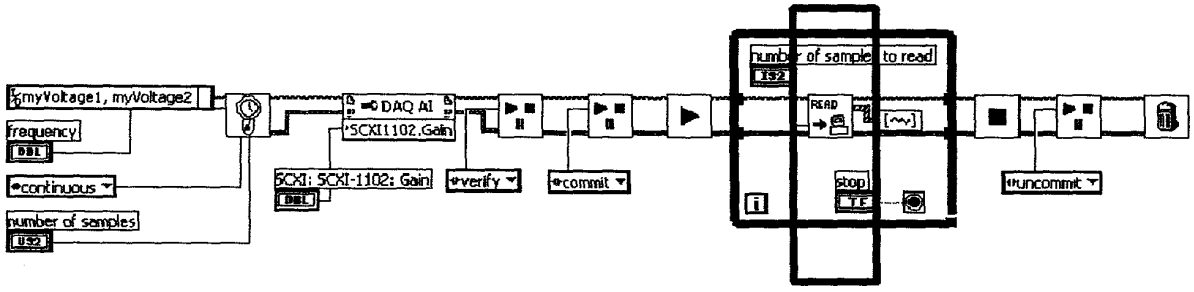
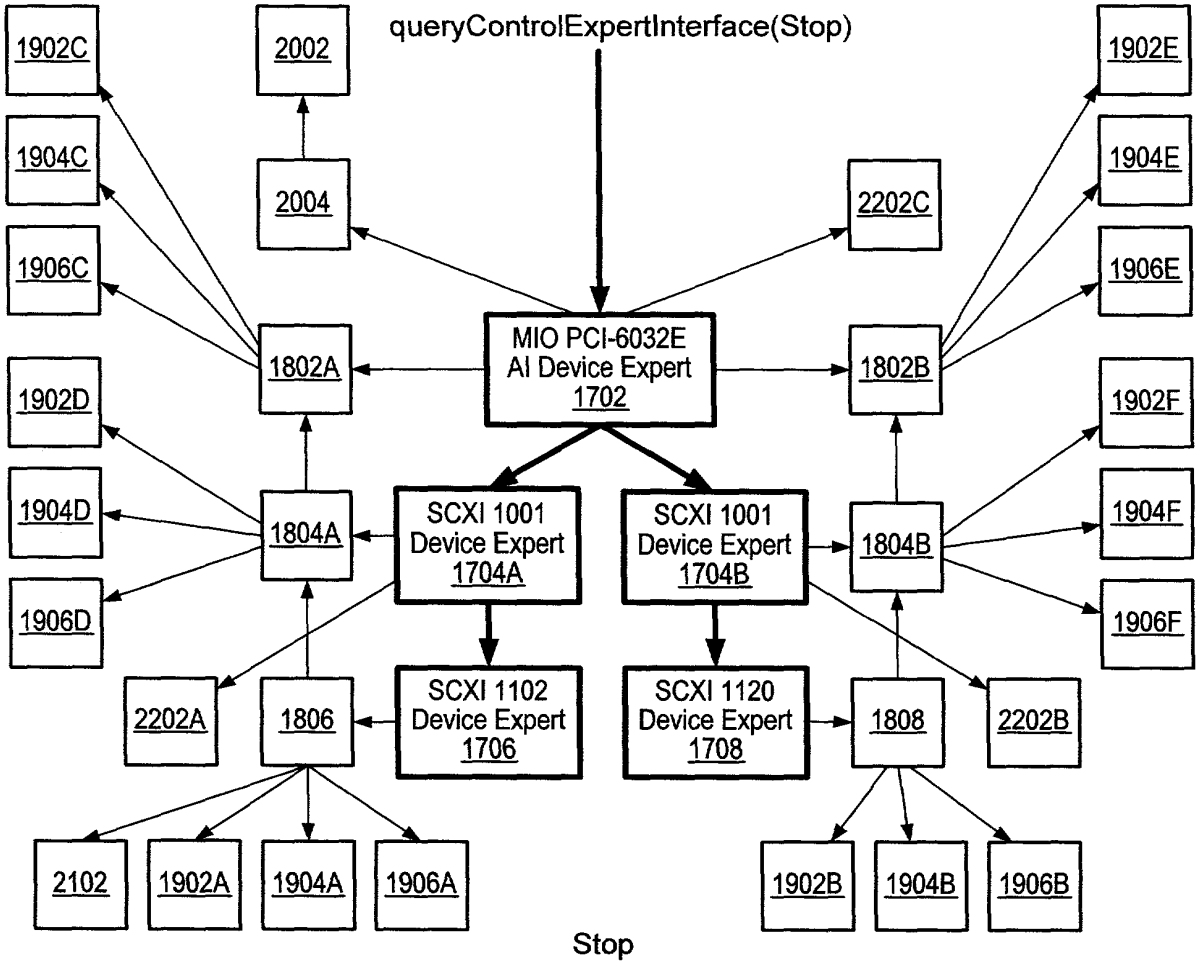

myVoltage1, myVoltage2
frequency
continuous
number of samples
DAQ AI
SCXI1102.Gain
SCXI: SCXI-1102: Gain
verify
commit
number of samples to read
READ
stop
uncommit

FIG. 24D


queryControlExpertInterface(Stop)
1902C
2002
1902E
1904C
2004
2202C
1904E
1906C
1906E
MIO PCI-6032E
AI Device Expert
1702
1802A
1802B
1902D
1902F
1904D
SCXI 1001
Device Expert
1704A
SCXI 1001
Device Expert
1704B
1804A
1804B
1904F
1906D
1906F
2202A
1806
SCXI 1102
Device Expert
1706
SCXI 1120
Device Expert
1708
1808
2202B
2102
1902A
1904A
1906A
1902B
1904B
1906B
Stop

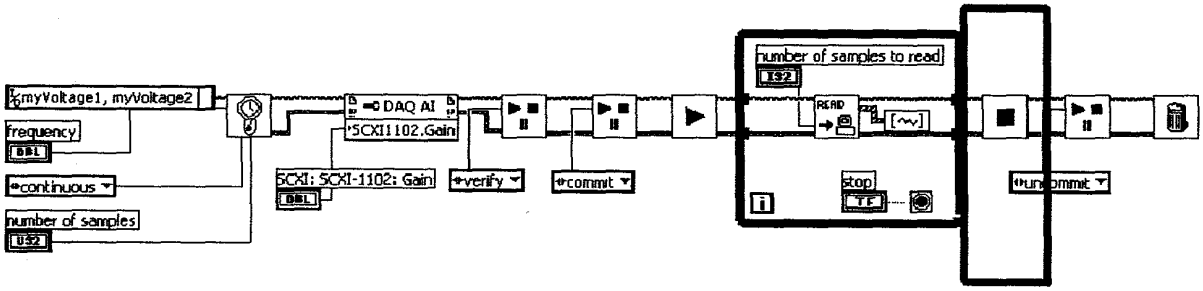
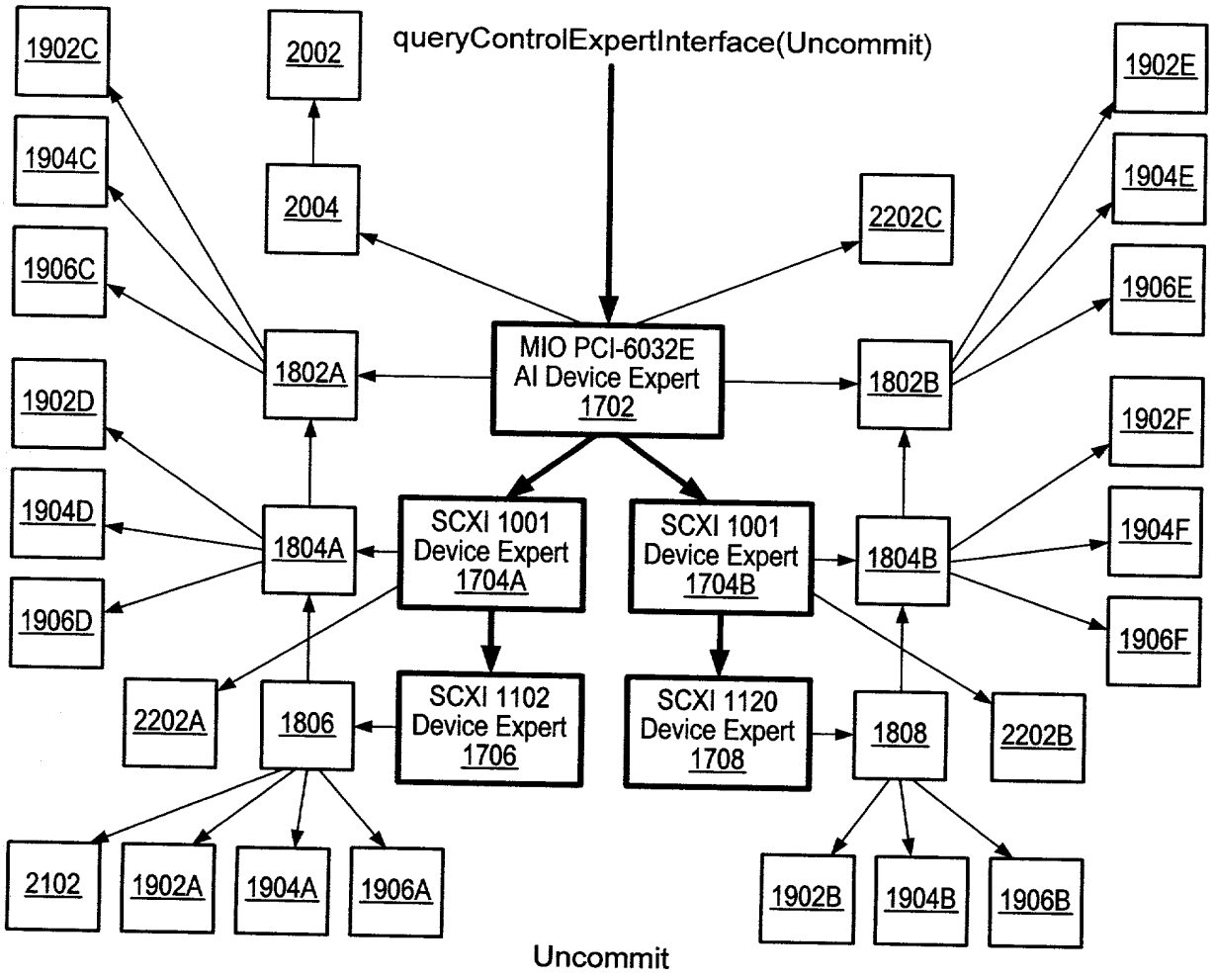

myVoltage1, myVoltage2
frequency
continuous
number of samples
DAQ AI
5CXI1102.Gain
5CXI::5CXI-1102::Gain
verify
commit
number of samples to read
READ
stop
uncommit

FIG. 24E


queryControlExpertInterface(Uncommit)
1902C
2002
1902E
1904C
2004
2202C
1904E
1906C
1906E
1802A
MIO PCI-6032E
AI Device Expert
1702
1802B
1902D
1902F
1904D
1804A
SCXI 1001
Device Expert
1704A
SCXI 1001
Device Expert
1704B
1804B
1904F
1906D
1906F
2202A
1806
SCXI 1102
Device Expert
1706
SCXI 1120
Device Expert
1708
1808
2202B
2102
1902A
1904A
1906A
1902B
1904B
1906B
Uncommit

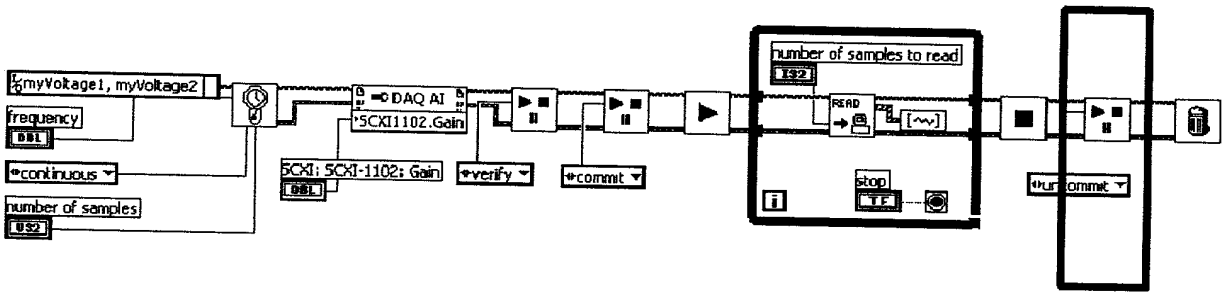

myVoltage1, myVoltage2
frequency
continuous
number of samples
DAQ AI
SCXI1102.Gain
SCXI: SCXI-1102: Gain
verify
commit
number of samples to read
READ
stop
uncommit

FIG. 24F

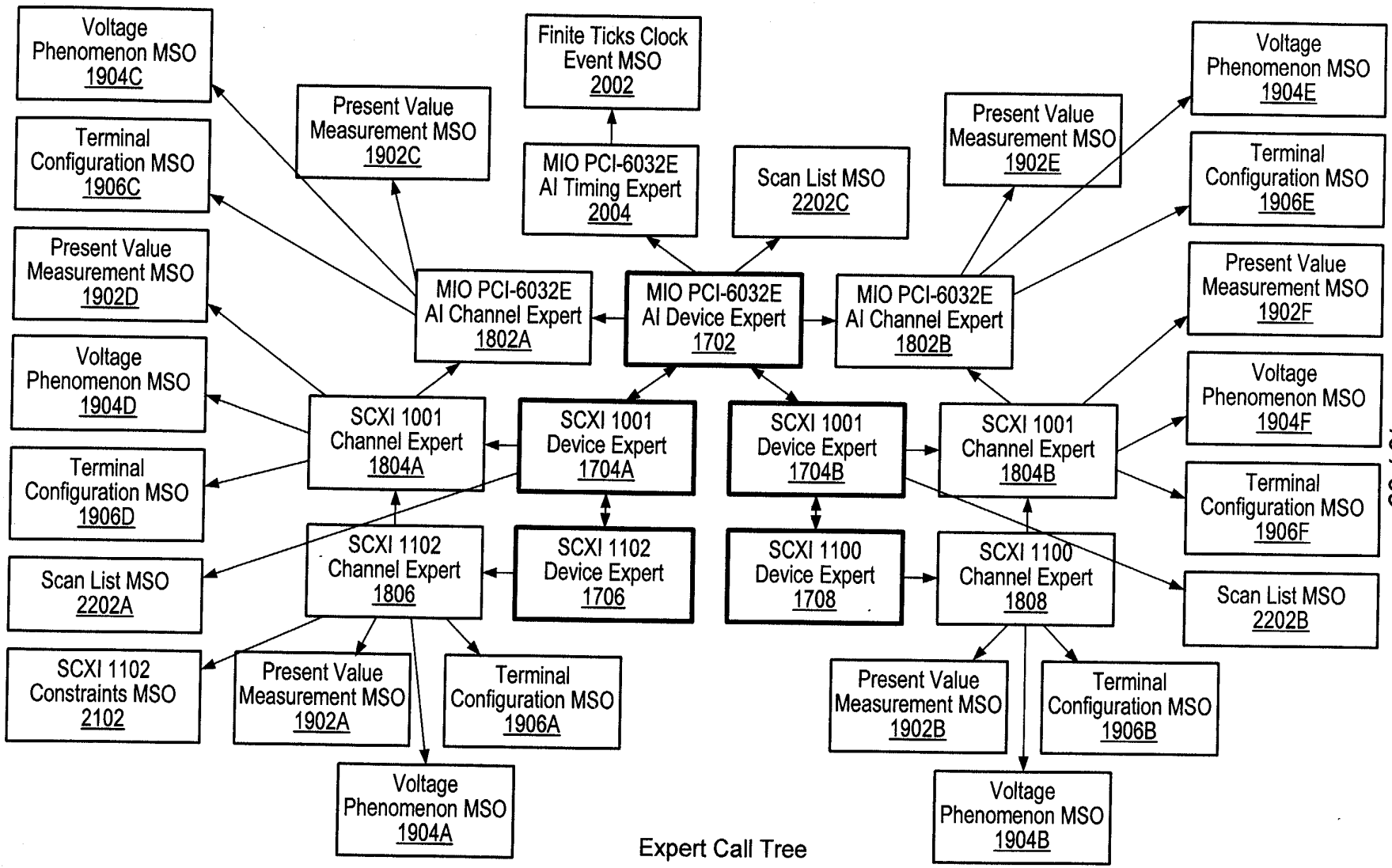


FIG. 25

Use Case: Multi-Chassis SCXI Finite Acquisition Using An MIO

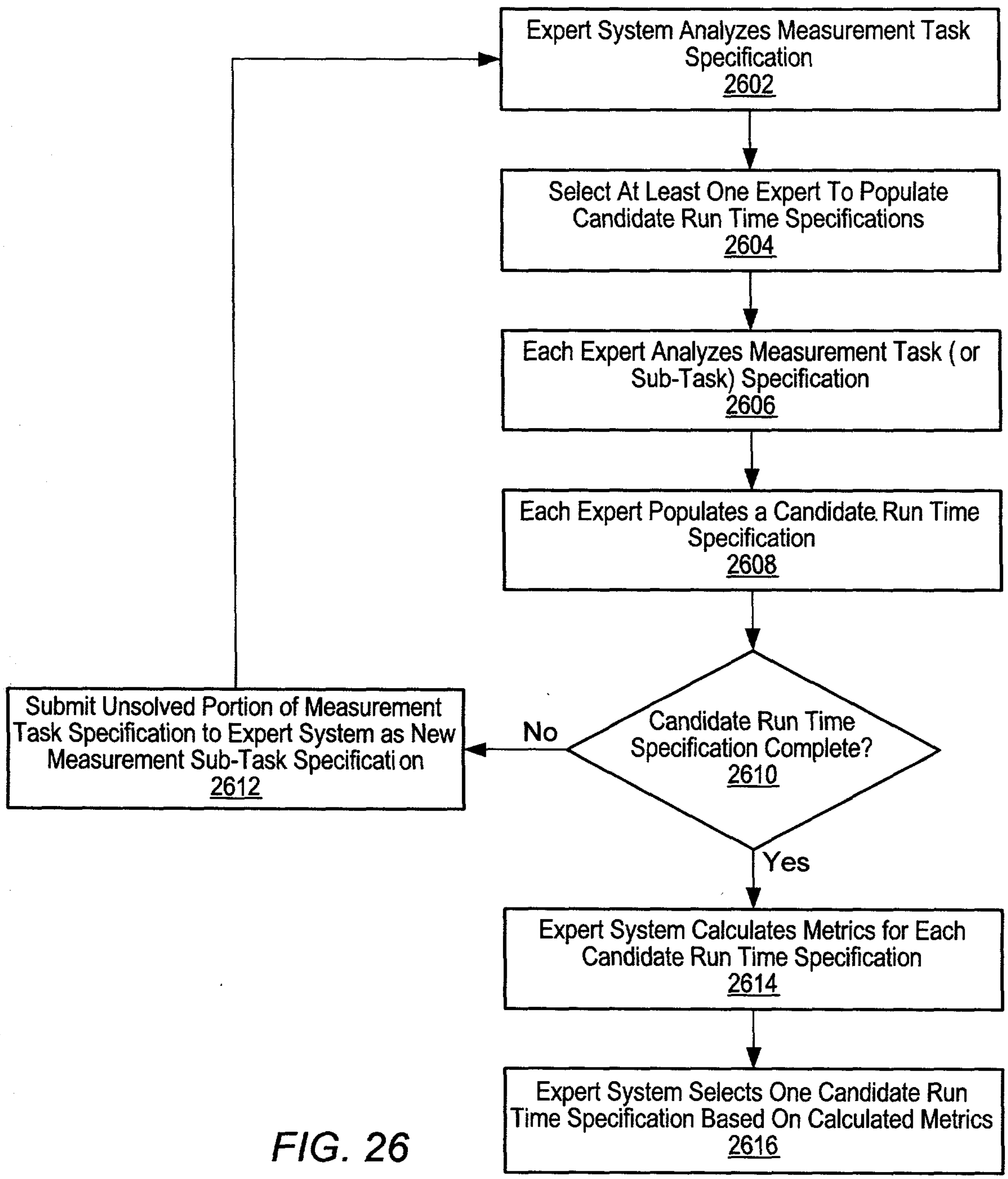

Expert System Analyzes Measurement Task Specification 2602
Select At Least One Expert To Populate Candidate Run Time Specifications 2604
Each Expert Analyzes Measurement Task (or Sub-Task) Specification 2606
Each Expert Populates a Candidate Run Time Specification 2608
Candidate Run Time Specification Complete? 2610
No
Submit Unsolved Portion of Measurement Task Specification to Expert System as New Measurement Sub-Task Specification 2612
Yes
Expert System Calculates Metrics for Each Candidate Run Time Specification 2614
Expert System Selects One Candidate Run Time Specification Based On Calculated Metrics 2616

FIG. 26

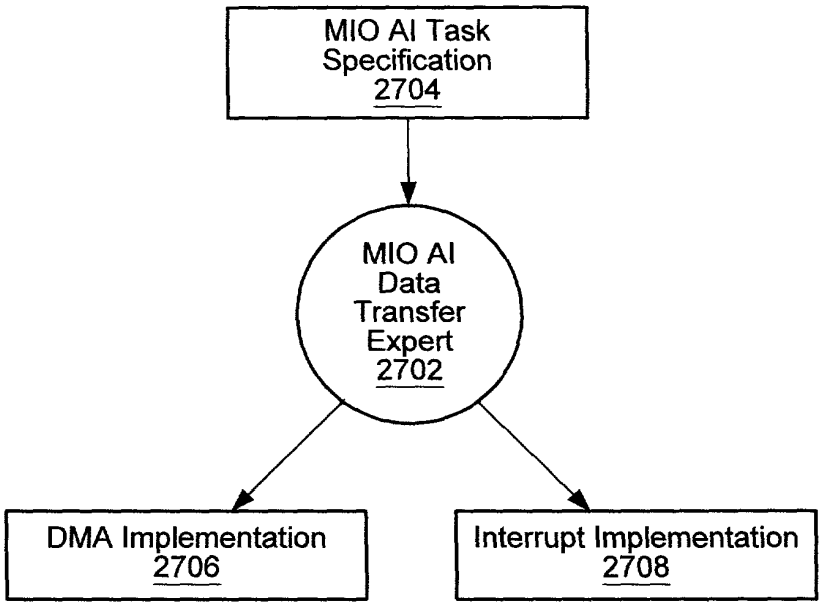


FIG. 27

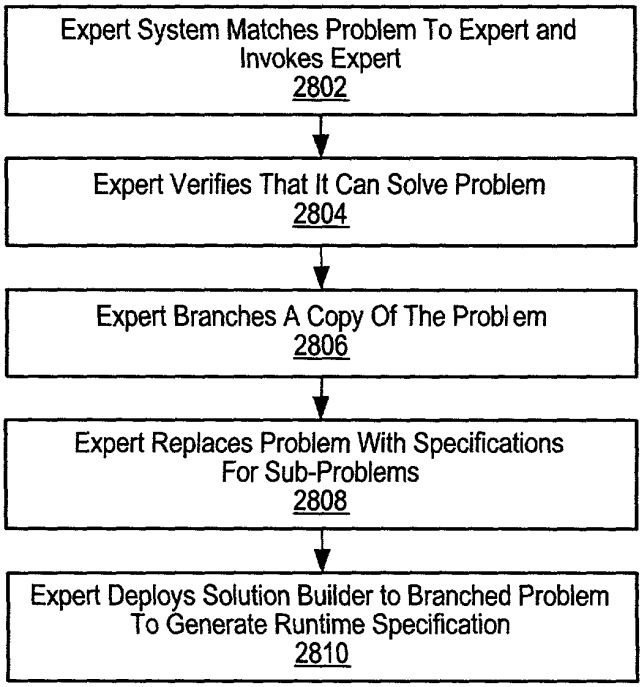


FIG. 28

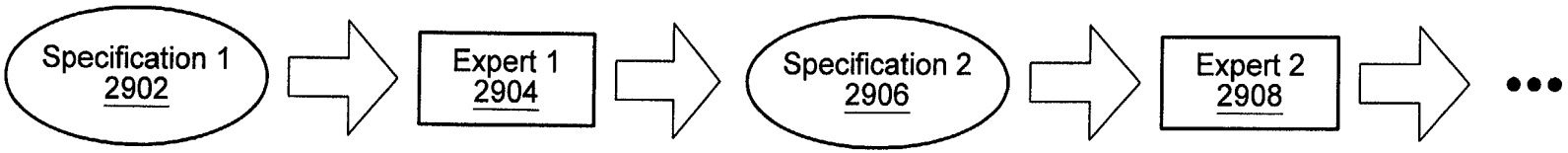

Specification 1
2902
Expert 1
2904
Specification 2
2906
Expert 2
2908

FIG. 29

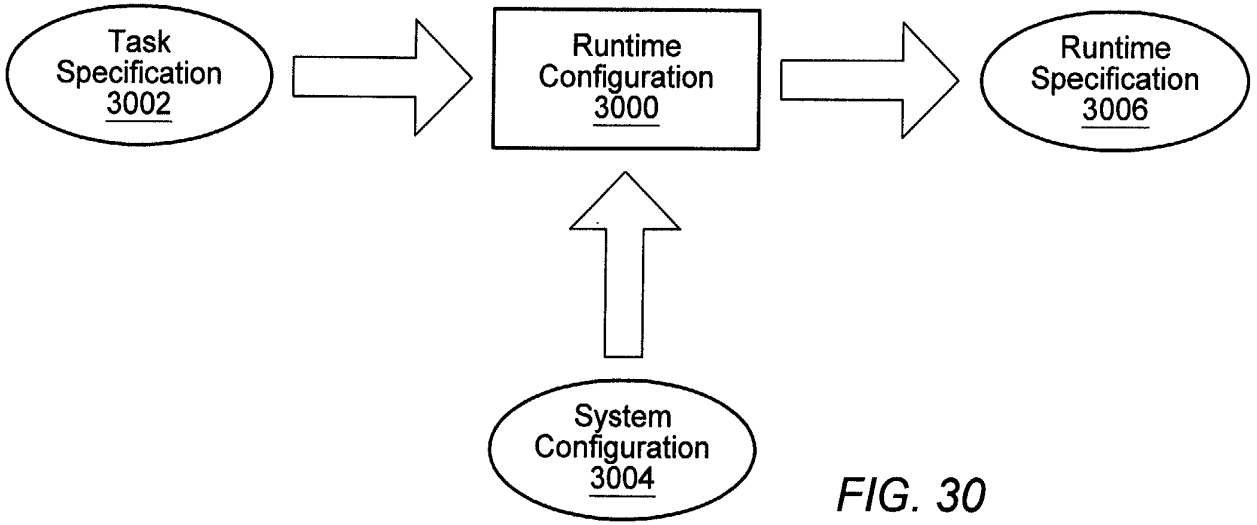

Task
Specification
3002
Runtime
Configuration
3000
Runtime
Specification
3006
System
Configuration
3004

FIG. 30

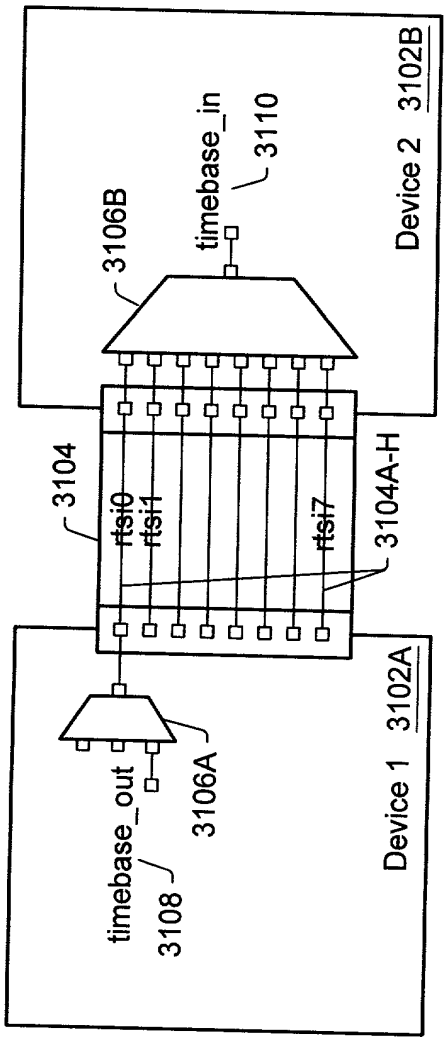

Device 2 3102B
3106B
timebase_in
3110
3104
rtsi0
rtsi1
rtsi7
3104A-H
Device 1 3102A
timebase_out
3108
3106A

FIG. 31

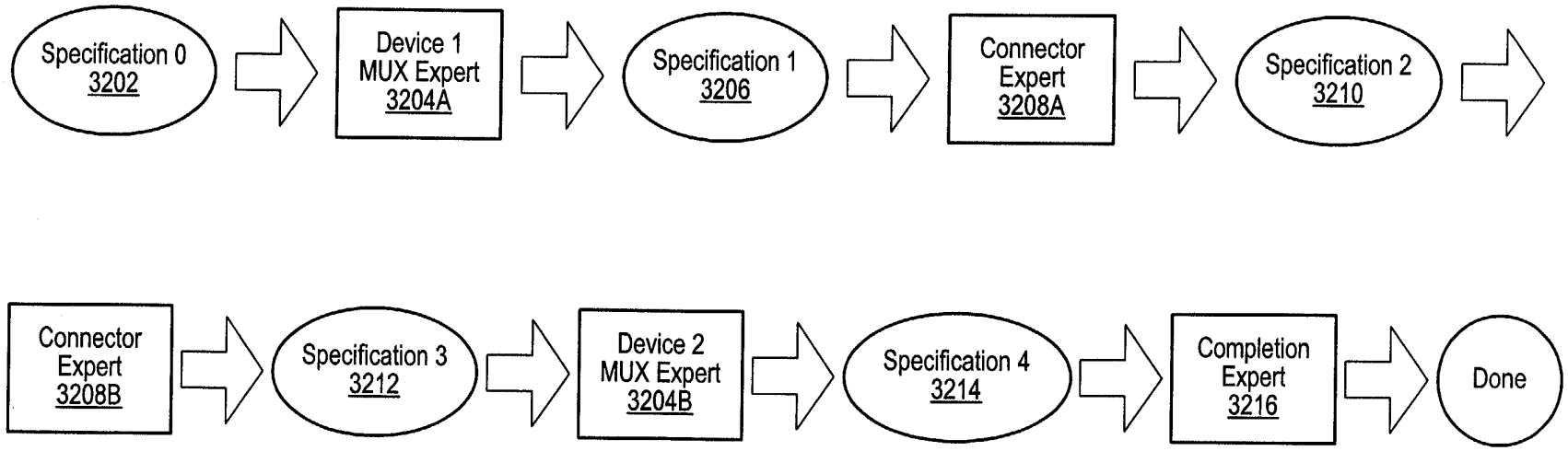

Specification 0
3202
Device 1
MUX Expert
3204A
Specification 1
3206
Connector
Expert
3208A
Specification 2
3210
Connector
Expert
3208B
Specification 3
3212
Device 2
MUX Expert
3204B
Specification 4
3214
Completion
Expert
3216
Done

FIG. 32

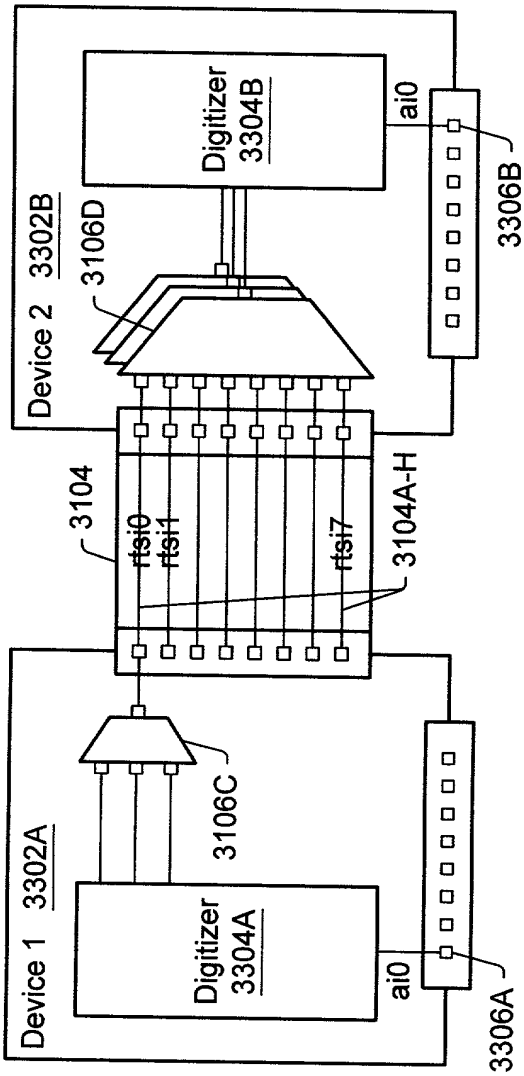

Device 1 3302A
Digitizer 3304A
ai0
3306A
3106C
3104
rtsi0
rtsi1
rtsi7
3104A-H
Device 2 3302B
3106D
Digitizer 3304B
ai0
3306B

FIG. 33

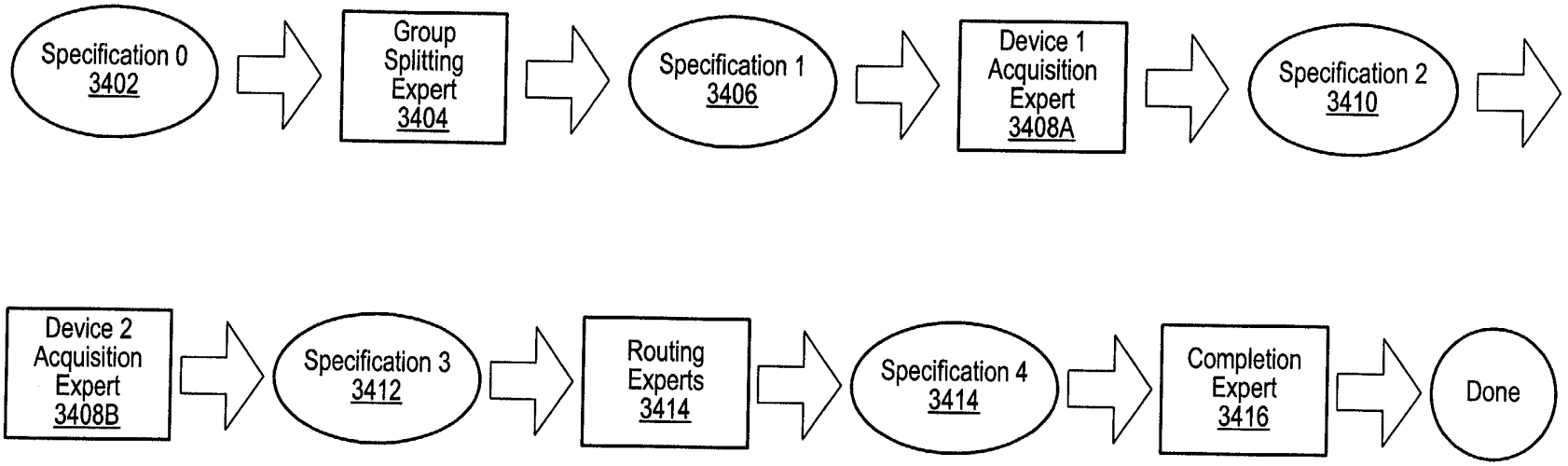

Specification 0
3402
Group Splitting Expert
3404
Specification 1
3406
Device 1 Acquisition Expert
3408A
Specification 2
3410
Device 2 Acquisition Expert
3408B
Specification 3
3412
Routing Experts
3414
Specification 4
3414
Completion Expert
3416
Done

FIG. 34

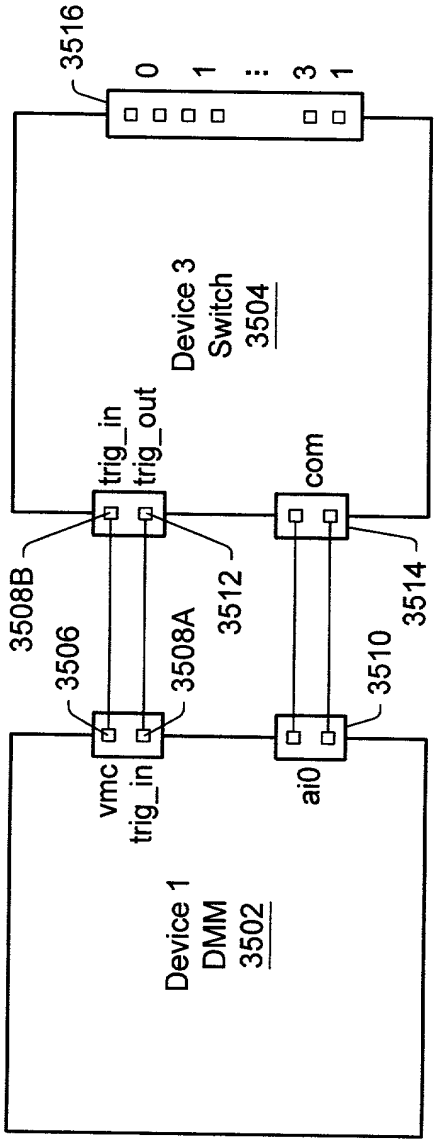

3516
0
1
:
3
1
Device 3
Switch
3504
trig_in
trig_out
com
3508B
3506
3508A
3512
3514
3510
vmc
trig_in
ai0
Device 1
DMM
3502

FIG. 35

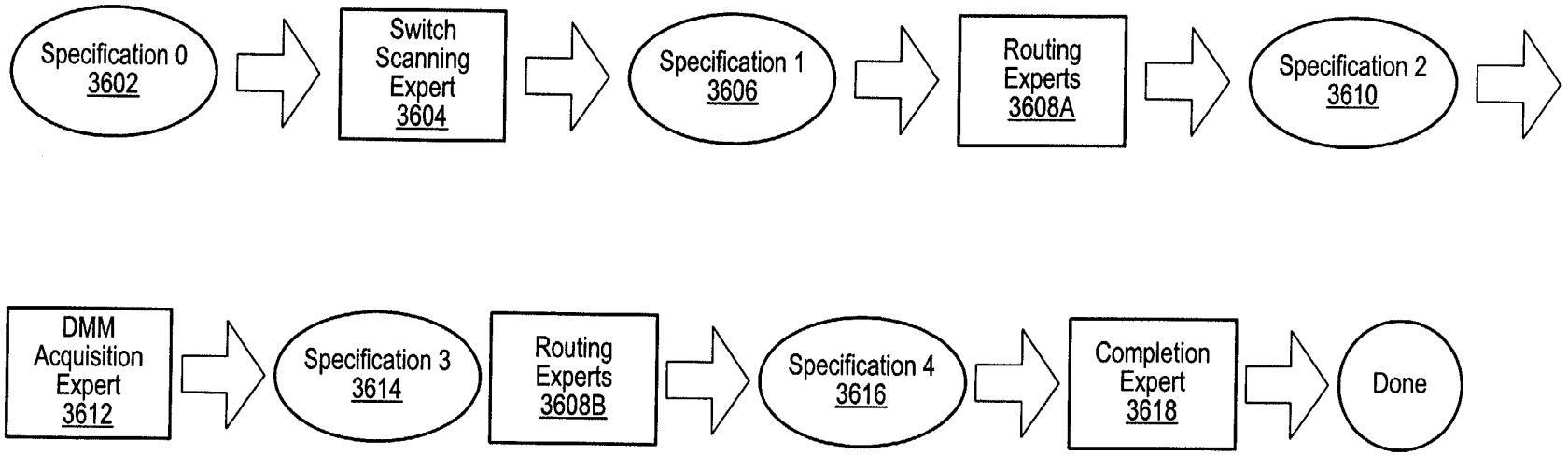

Specification 0
3602
Switch Scanning Expert
3604
Specification 1
3606
Routing Experts
3608A
Specification 2
3610
DMM Acquisition Expert
3612
Specification 3
3614
Routing Experts
3608B
Specification 4
3616
Completion Expert
3618
Done

FIG. 36

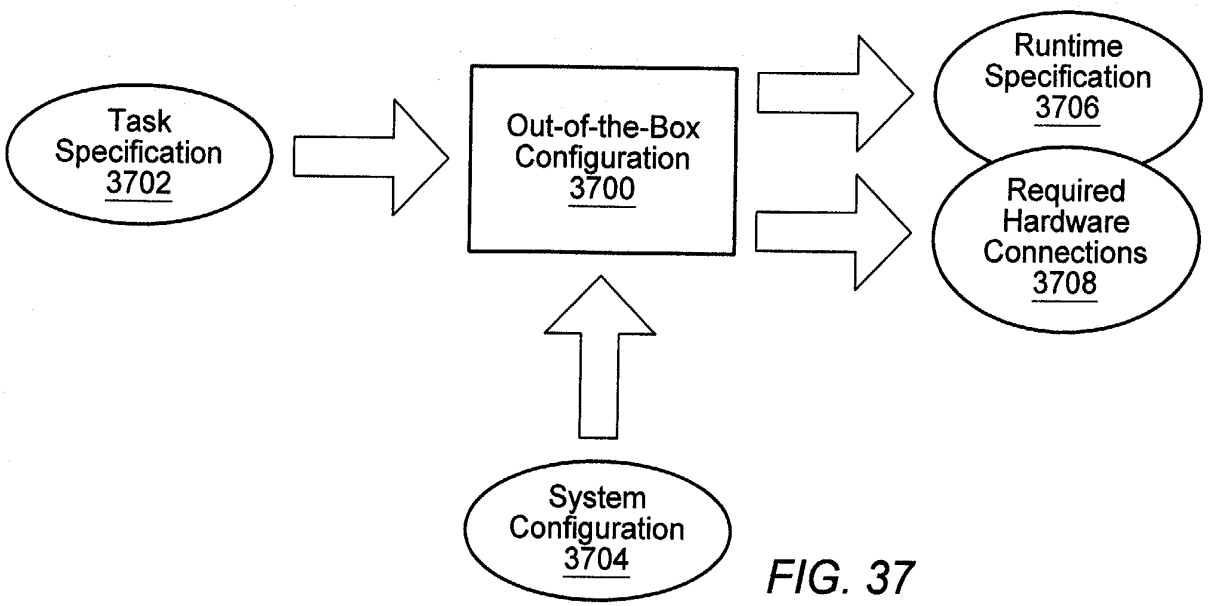

Task Specification 3702
Out-of-the-Box Configuration 3700
Runtime Specification 3706
Required Hardware Connections 3708
System Configuration 3704

FIG. 37

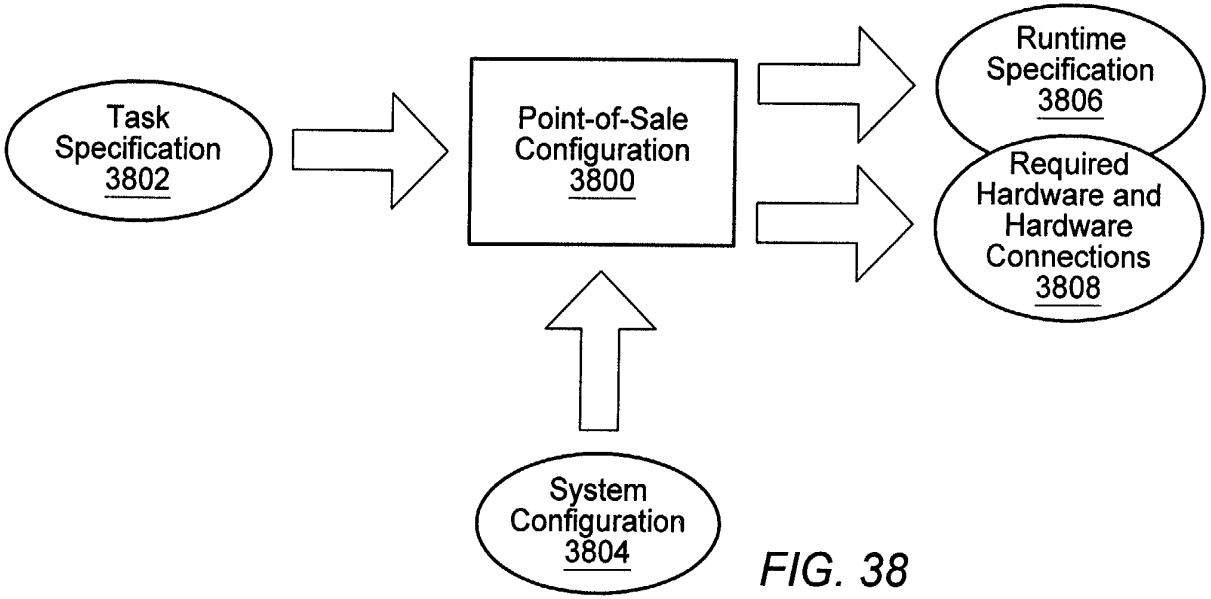
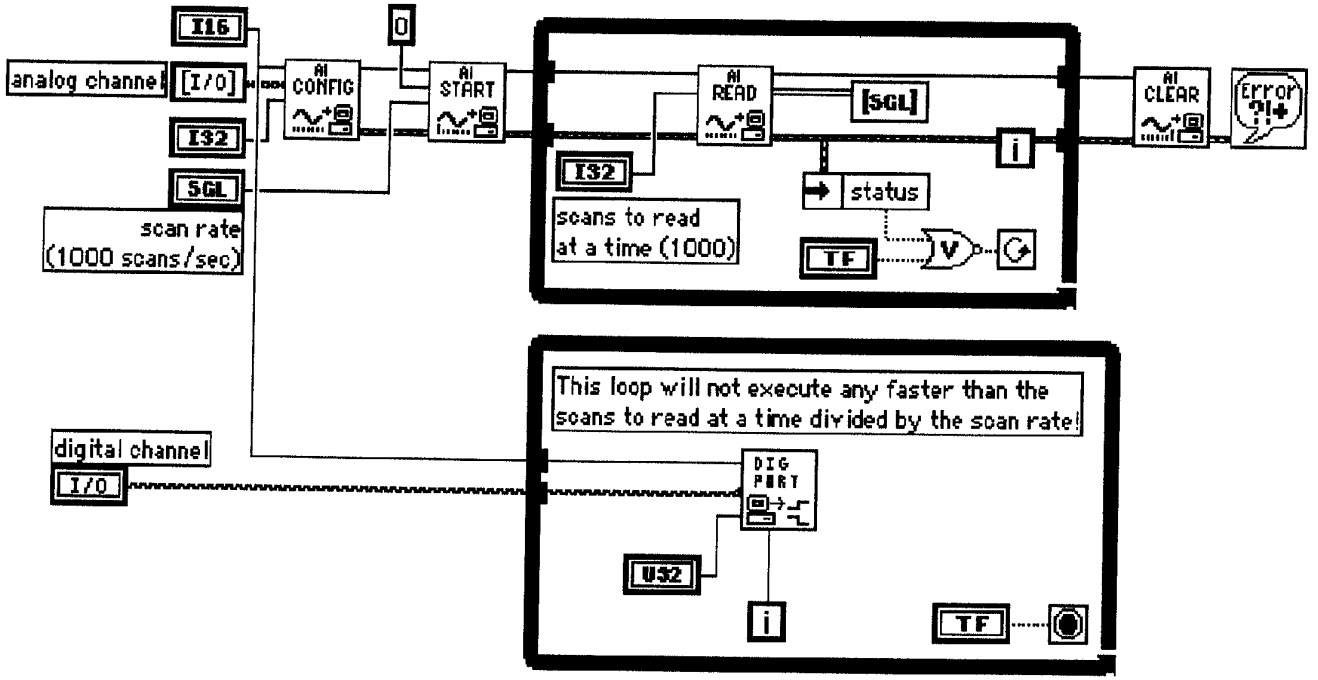
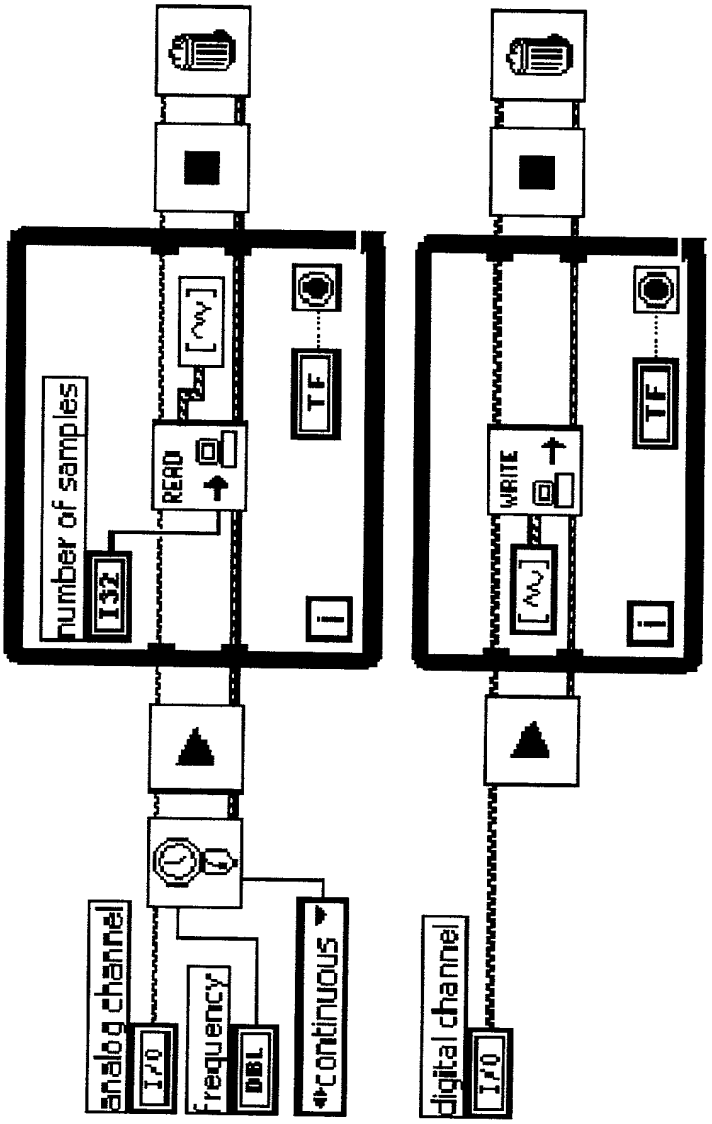

Task Specification 3802
Point-of-Sale Configuration 3800
Runtime Specification 3806
Required Hardware and Hardware Connections 3808
System Configuration 3804

FIG. 38



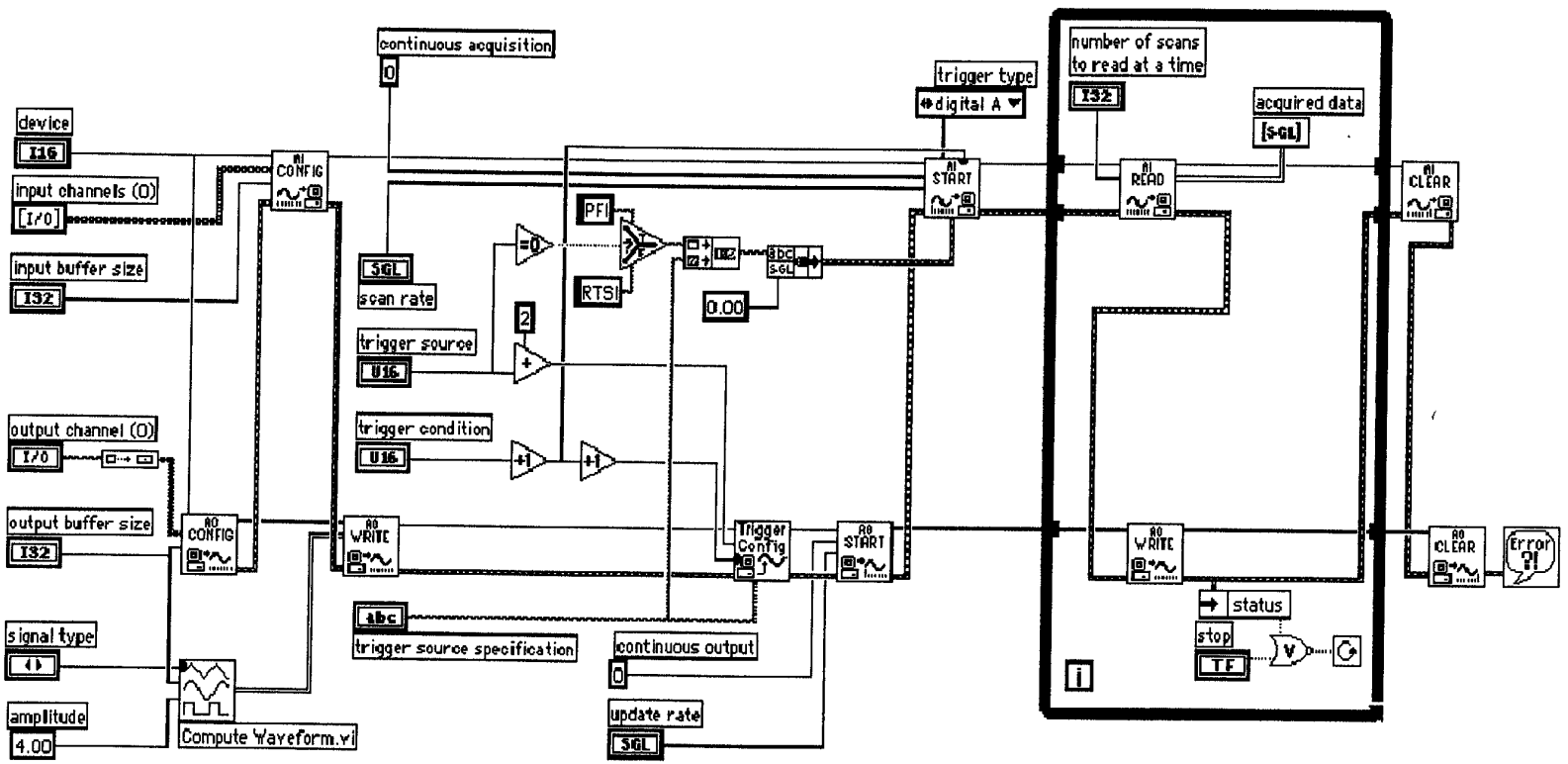
Simultaneous Buffered Analog Input And Single Point Digital Output With Single-Threaded Driver (Prior Art)

FIG. 39A
(Prior Art)



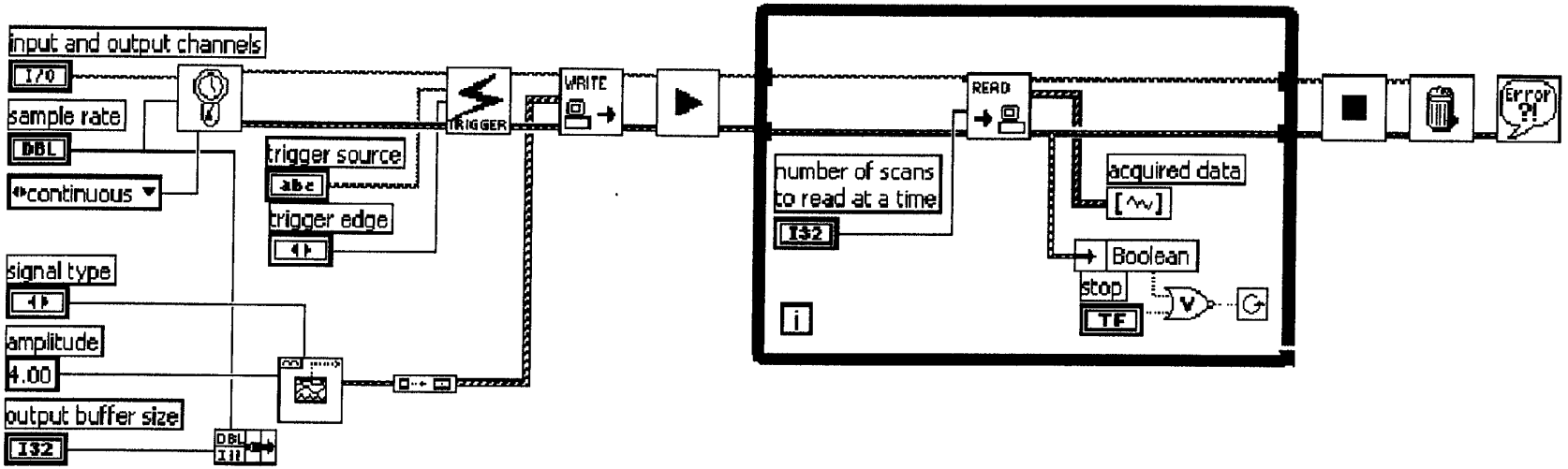
Simultaneous Buffered Analog Input And Single Point Digital Output With Multi-Threaded Driver

FIG. 39B



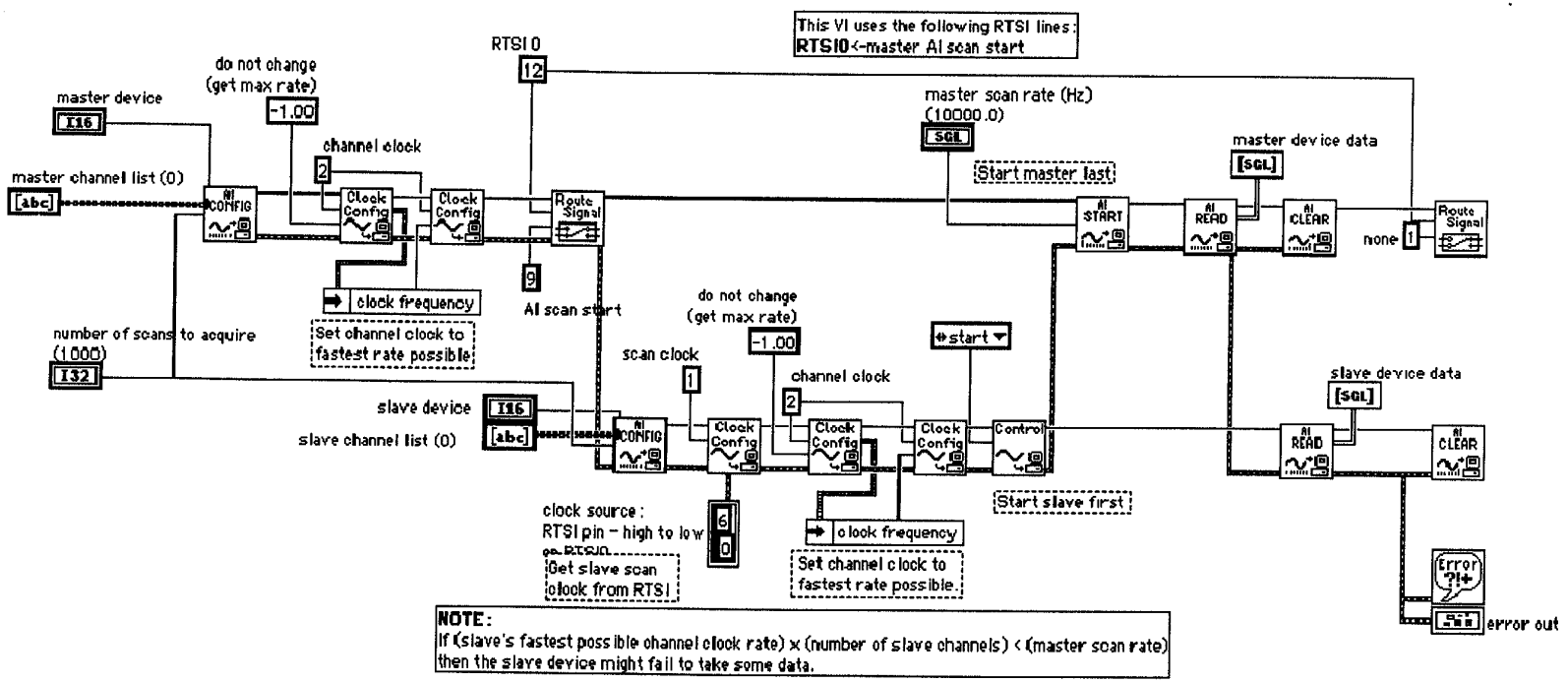
Simultaneous Triggered Buffered AI/AO (Prior Art)

FIG. 40A



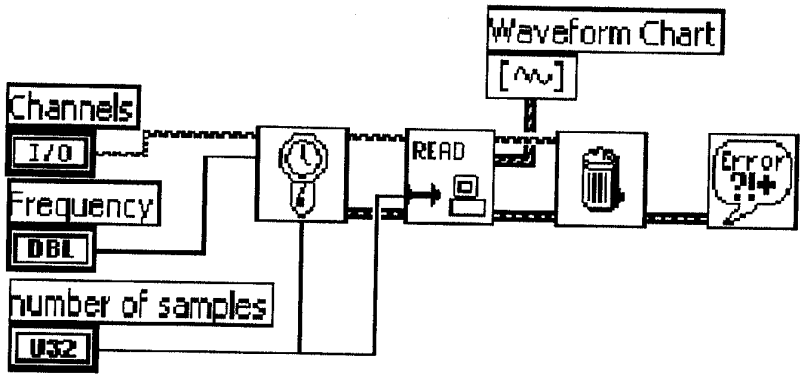
Simultaneous Triggered Buffered AI/AO

FIG. 40B



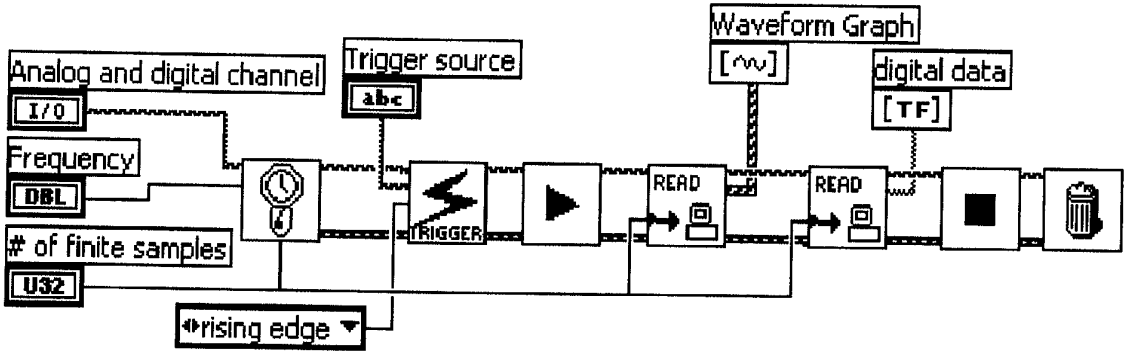
Sharing Scan Clock Across Two E-Series Devices (Prior Art)

FIG. 41A



Sharing Scan Clock Across Two E-Series Devices

FIG. 41B



Sharing Clock And Trigger, Buffered AI & DI

FIG. 42

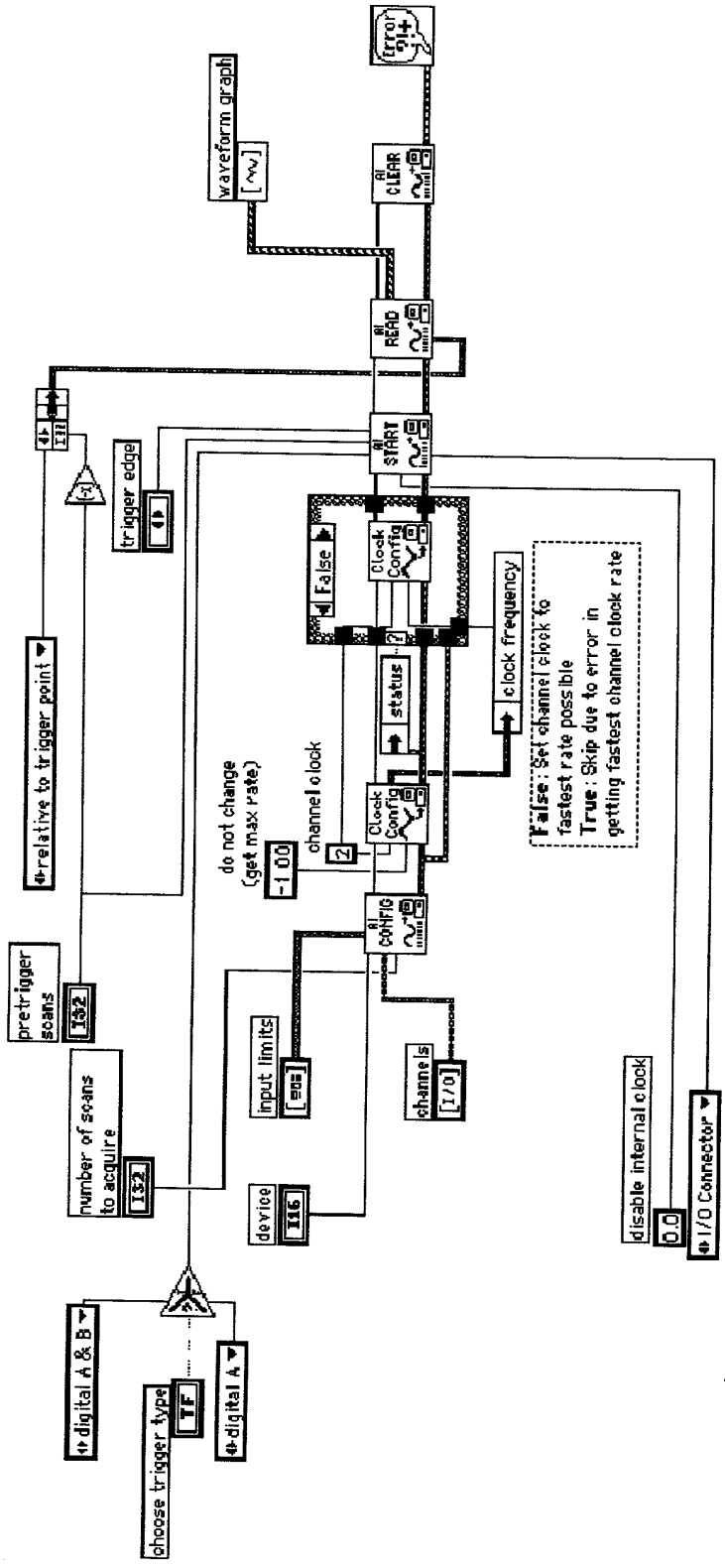


FIG. 43A
(Prior Art)

Acquire N Scans External Scan Clock Digital Trigger (Prior Art)

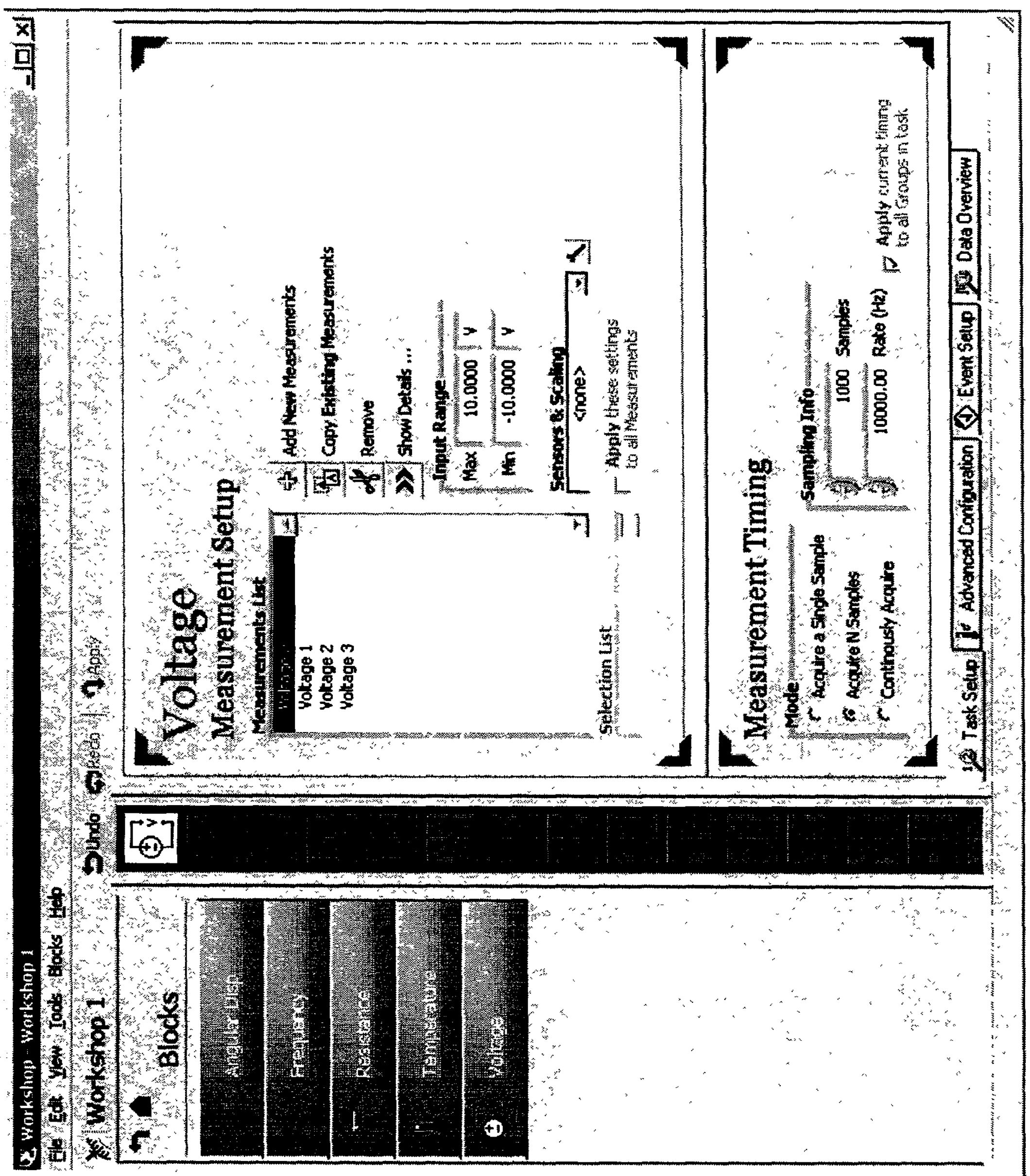

Workshop - Workshop 1
File
Edit
View
Tools
Blocks
Help
Workshop 1
Blocks
Angular Disp
Frequency
Resistance
Temperature
Voltage
Undo
Redo
Apply
Voltage
Measurement Setup
Measurements List
Voltage 1
Voltage 2
Voltage 3
Add New Measurements
Copy Existing Measurements
Remove
Show Details ...
Input Range
Max
10.0000
V
Min
-10.0000
V
Sensors & Scaling
<none>
Selection List
Apply these settings
to all Measurements
Measurement Timing
Mode
Acquire a Single Sample
Acquire N Samples
Continously Acquire
Sampling Info
1000
Samples
10000.00
Rate (Hz)
Apply current timing
to all Groups in task
Task Setup
Advanced Configuration
Event Setup
Data Overview

FIG. 43B

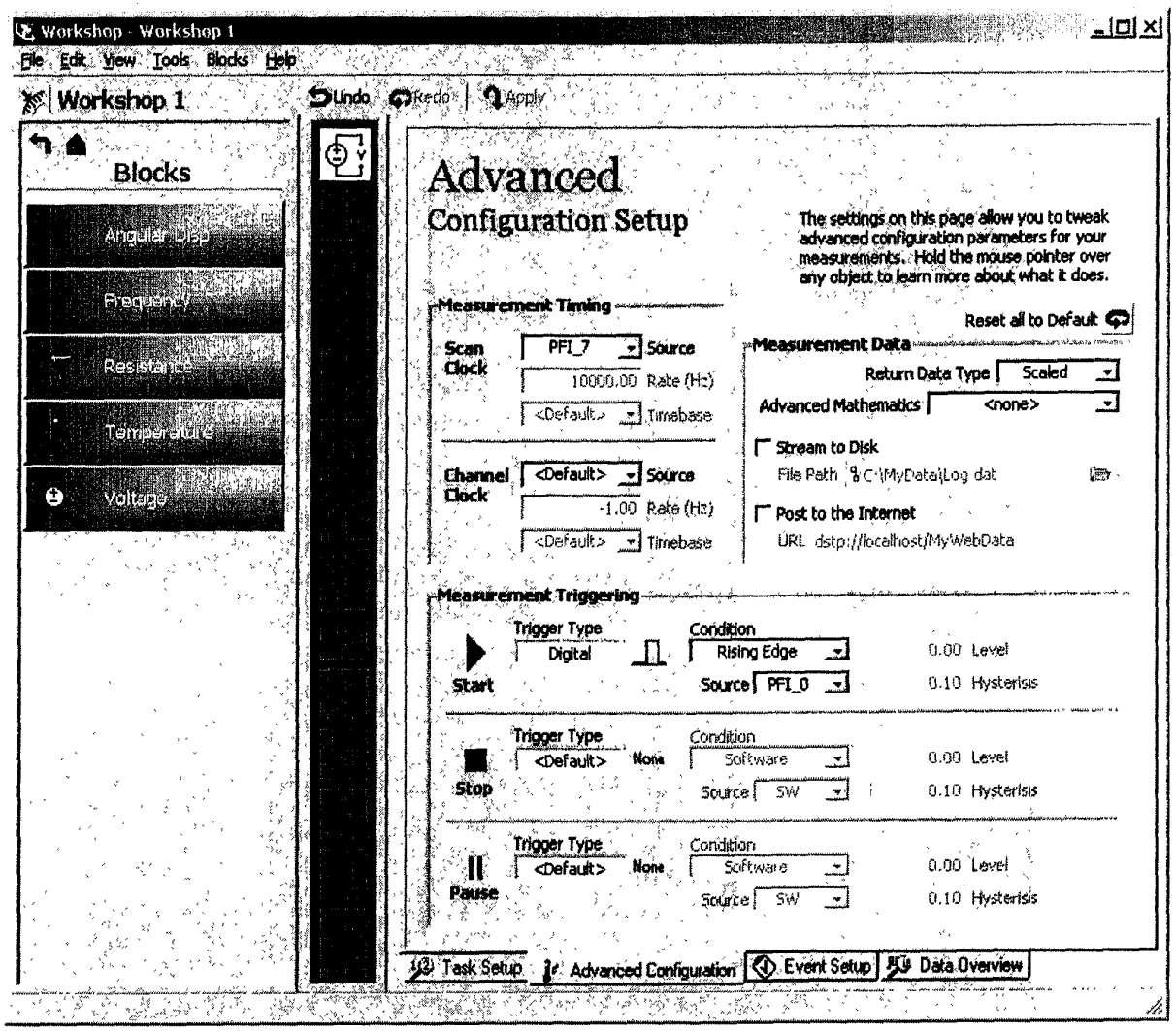
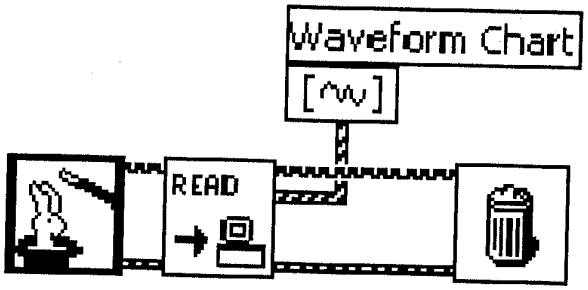
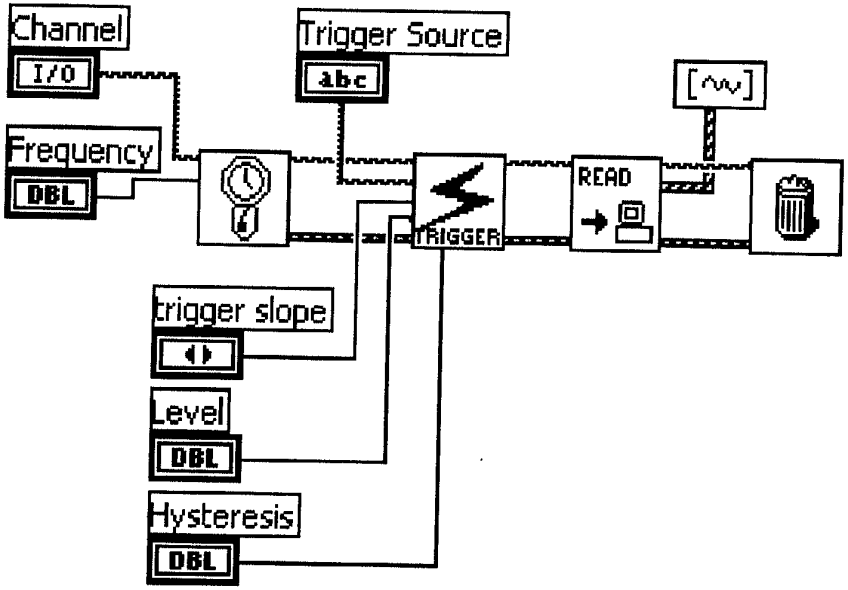

Workshop - Workshop 1
File Edit View Tools Blocks Help
Workshop 1
Undo
Redo
Apply
Blocks
Angular Disp
Frequency
Resistance
Temperature
Voltage
Advanced
Configuration Setup
The settings on this page allow you to tweak advanced configuration parameters for your measurements. Hold the mouse pointer over any object to learn more about what it does.
Reset all to Default
Measurement Timing
Scan Clock
PFI_7
Source
10000.00
Rate (Hz)
<Default>
Timebase
Channel Clock
<Default>
Source
-1.00
Rate (Hz)
<Default>
Timebase
Measurement Data
Return Data Type
Scaled
Advanced Mathematics
<none>
Stream to Disk
File Path
C:\MyData\Log.dat
Post to the Internet
URL
dstp://localhost/MyWebData
Measurement Triggering
Start
Trigger Type
Digital
Condition
Rising Edge
Source
PFI_0
0.00
Level
0.10
Hysterisis
Stop
Trigger Type
<Default>
None
Condition
Software
Source
SW
0.00
Level
0.10
Hysterisis
Pause
Trigger Type
<Default>
None
Condition
Software
Source
SW
0.00
Level
0.10
Hysterisis
Task Setup
Advanced Configuration
Event Setup
Data Overview

FIG. 43C



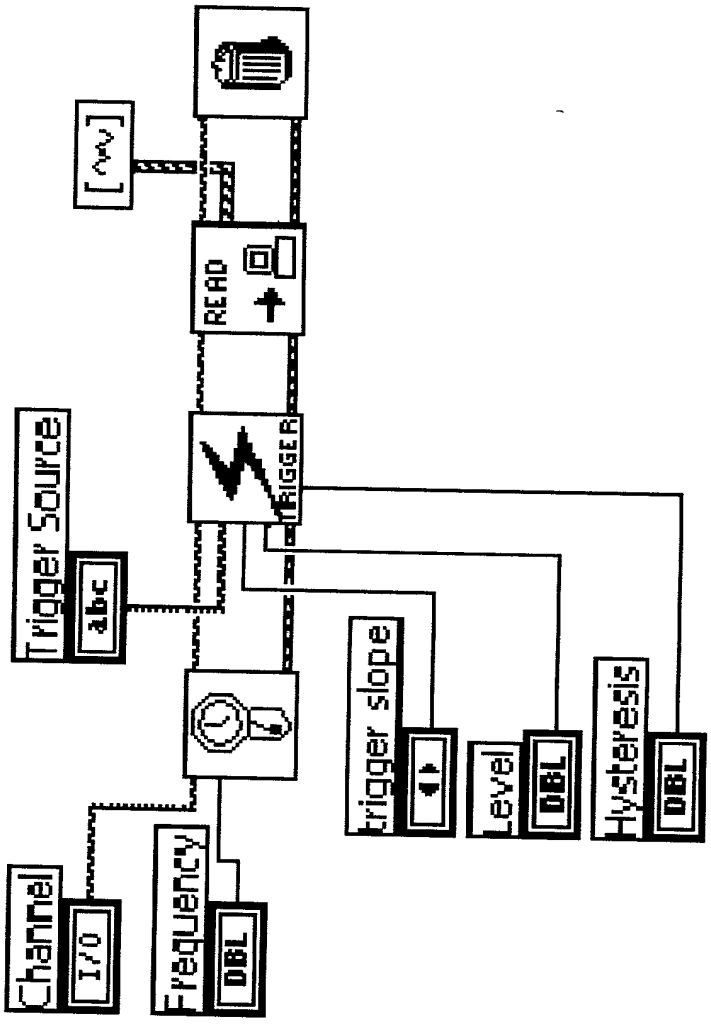
Acquire N Scans External Scan Clock Digital Trigger

FIG. 43D



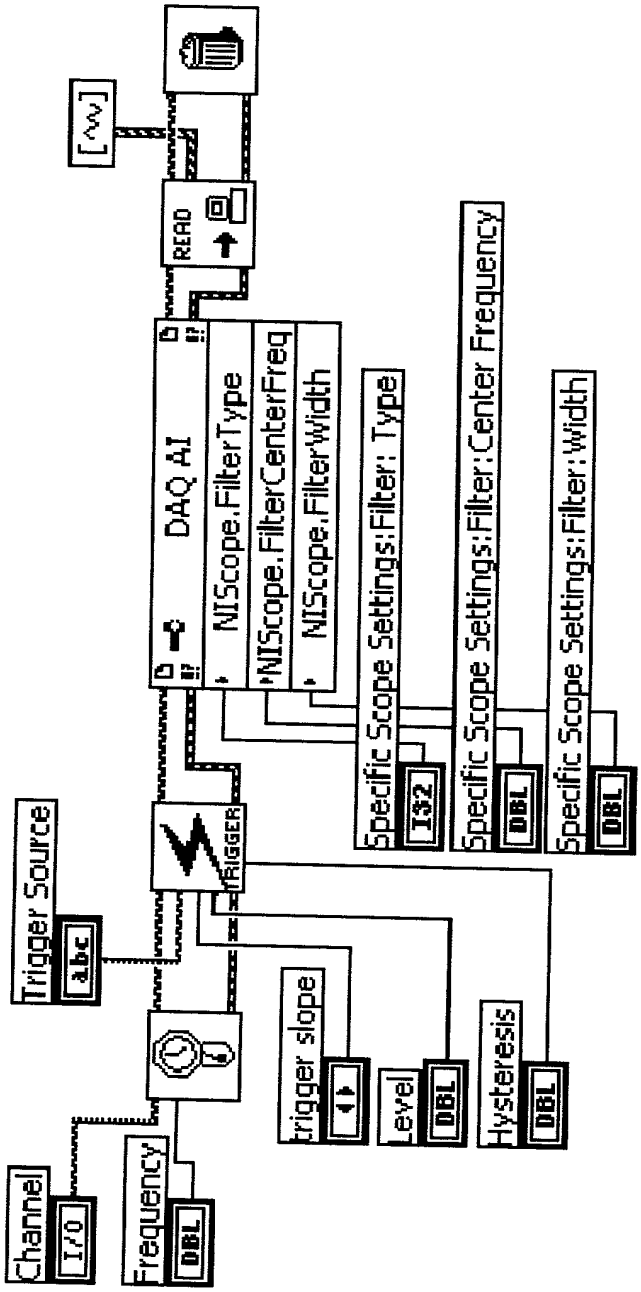
Triggered Acquisition With E-Series Device

FIG. 44A



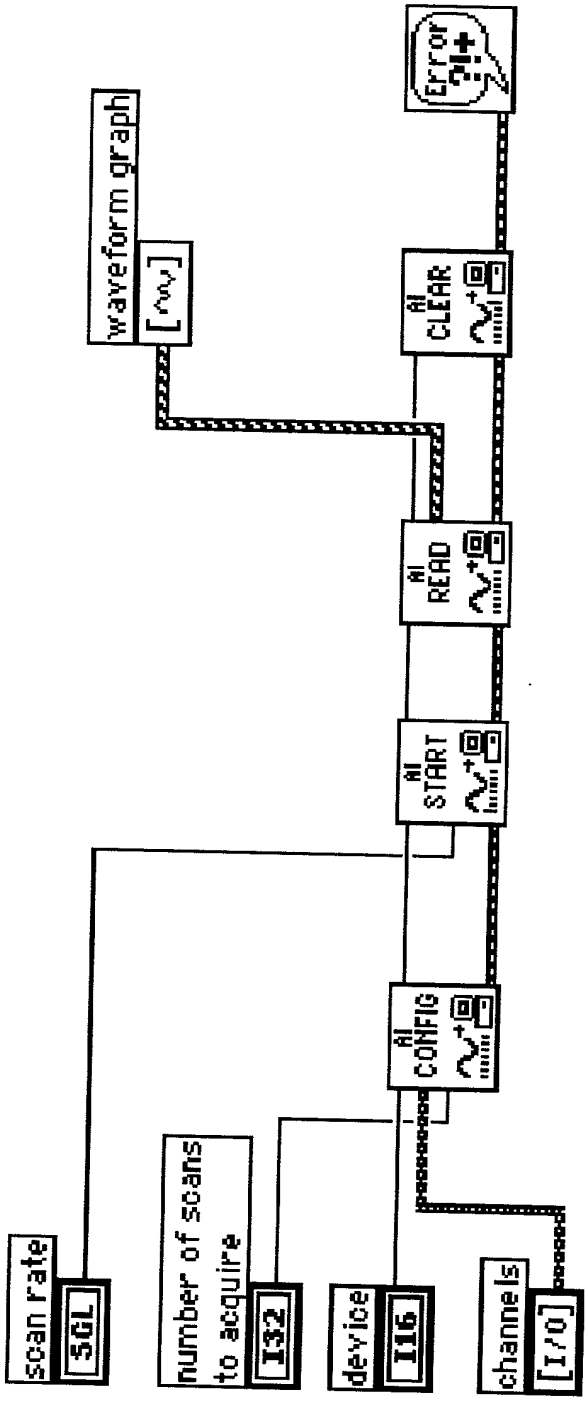
Triggered Acquisition With High Speed Digitizer

FIG. 44B



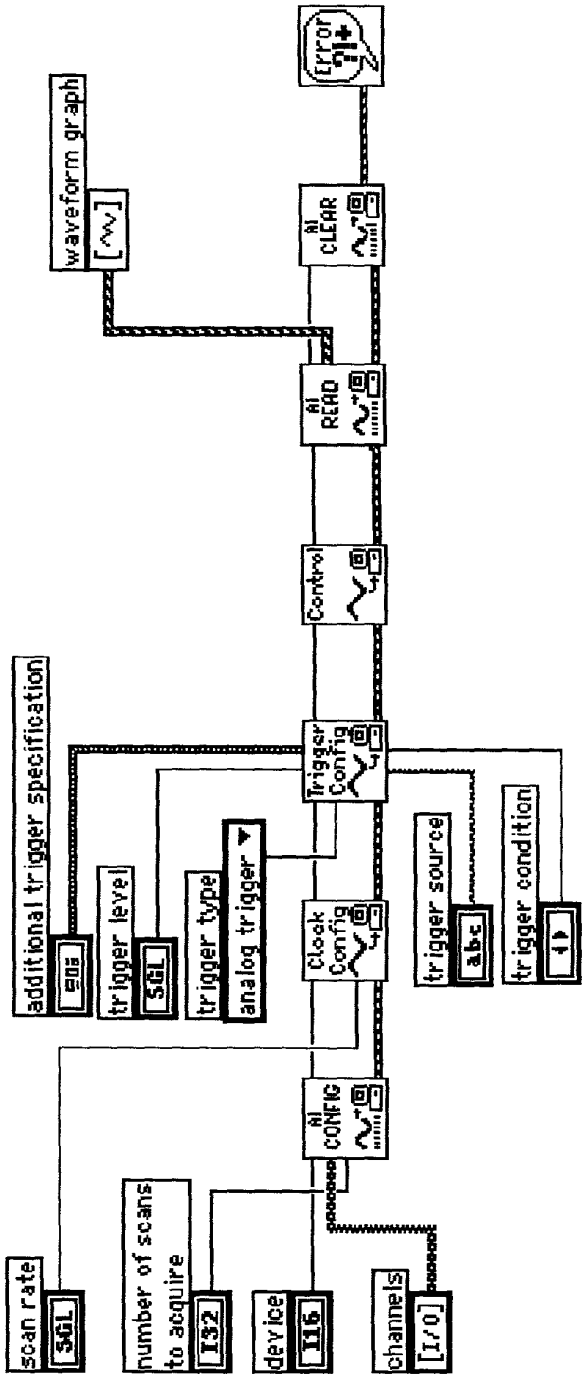
Triggered Acquisition With High Speed Digitizer With Filtering

FIG. 44C



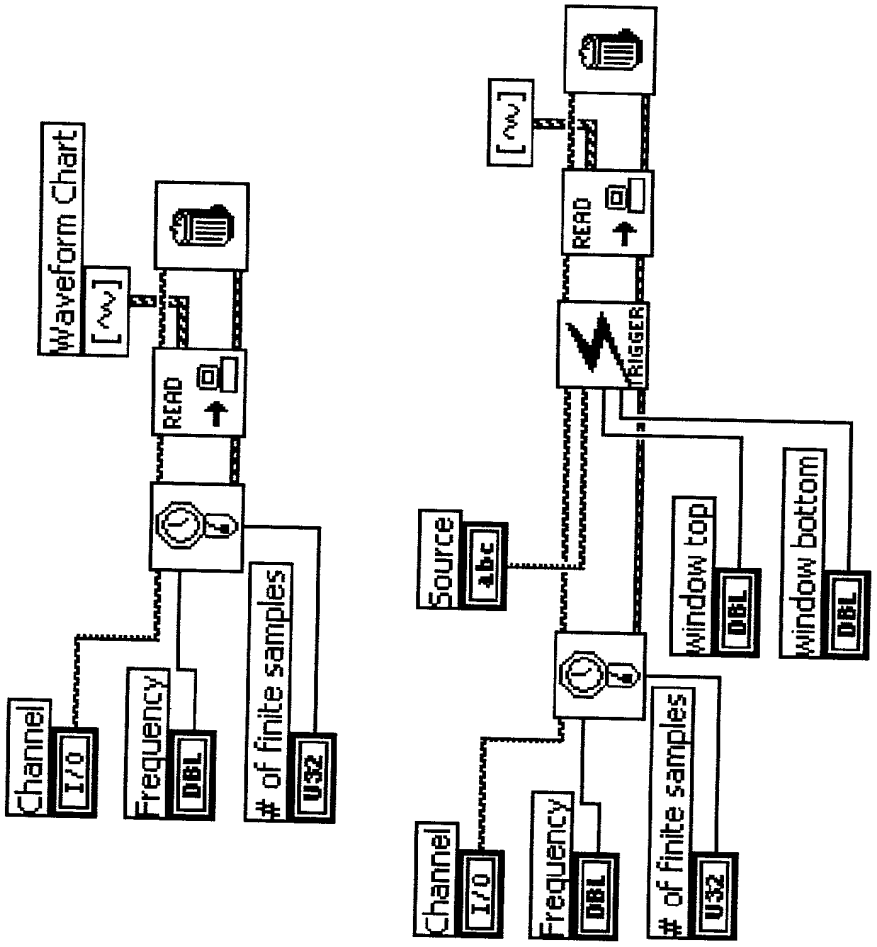
Intermediate Layer (Prior Art)

FIG. 45A



Changes For Analog Window Triggering (Prior Art)

FIG. 45B



Analog Window Triggering

FIG. 45C